



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 Ministry of Science & Technology Govt. of India.



ANNUAL REPORT 2022-23

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2022-23



HAFFKINE INSTITUTE FOR TRAINING, RESEARCH AND TESTING

Acharya Donde Marg, Parel, Mumbai 400 012.

www.haffkineinstitute.org

(Revamped under MahaIT)

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Director's Desk



**Ms. Seema Vyas (IAS),
Director,
Haffkine Institute**

Greetings from Haffkine Institute!!

It gives me immense pleasure as a director of this prestigious institute to present to you the annual report of the institute for the year 2022-23.

Haffkine Institute is one of the oldest biomedical research institutes in the country and over the years, it has evolved as a centre for multidisciplinary research with public health at its focus. We are committed towards the serving the welfare of humans by means of ameliorating and alleviating sufferings, providing holistic measures to research, prevention, treatment and education in biomedical and allied fields of science.

Through this annual report, I would like to highlight the research, training and testing activities of the all department of institute and also to convey the achievements made by each department in their domain.

Looking at the dedication and commitment of the staff of the institute, I am confident that the staff of the Haffkine Institute will be ready to face new challenges in the next year. Also their whole hearted participation in the Institute's research, training & testing activities will help in achieving the Institute's goal to become one of the finest research Institutes in the country and in the world. I wish Haffkine staff and students all the best for their future endeavors.

GOVERNING COUNCIL		
2022-23		
1	Shri. Girish Mahajan Hon. Minister, Medical Education Government of Maharashtra Mantralaya, Mumbai 400 032. Email - min.wrd@maharashtra.gov.in Ph – 022-22024832, 022-22026658	President
2	Hon. Minister of State, Medical Education Government of Maharashtra Mantralaya, Mumbai 400 032.	Vice – President
3	Dr. Ashwini Joshi, IAS Secretary, Medical Education and Drugs Department, Government of Maharashtra, Mantralaya, Mumbai – 400 032. Email - psec.mededu@maharashtra.gov.in Ph – 022-22719466, 022-22719477	Member
4	Shri. Abhimanyu Kale, IAS Commissioner, Food and Drugs Administration, Bandra-Kurla Complex, Bandra (E), Mumbai – 400 051. Email - comm.fda-mah@nic.in Ph – 022-26590548	Member
5	Dr. Dilip Mhaisekar Director, Medical Education and Research, Government of Maharashtra, St. George's Hospital Campus, Mumbai - 400001. Email - dmerps@gmail.com Ph – 022-22620735	Member
6	Dr. Atul Goel Director General of Health Services, Government of India, Room No. 444, 'A' Wing, Nirman Bhawan, New Delhi – 110108.	Member
7	Smt. Seema Vyas, IAS Director, Haffkine Institute for Training, Research and Testing, Parel, Mumbai – 400 012.	Member - Secretary

EXECUTIVE COMMITTEE

2022-23

1	Smt. Seema Vyas, IAS Director, Haffkine Institute for Training, Research and Testing, Parel, Mumbai – 400 012.	Chairperson
2	Dr. Shashikant P. Vaidya Asst. Director and HOD, Department of Clinical Pathology Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012. (01.04.2022 to 31.1.2023)	Member
3	Mrs. Suvarna Pachpore Senior Scientific Officer and HOD, Dept. of Chemical Testing, Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012.	Member
4	Dr. Usha Padmanabhan Senior Scientific Officer and HOD, Department of Biochemistry and Cell Biology Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012.	Member
5	Dr. Anuya Rege Senior Scientific Officer and HOD, Department of Bacteriology, Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012.	Member
6	Dr. Mrunal Ghag-Sawant Scientific Officer and HOD Venomous Animal Unit, Zoonosis Dept. and Toxicology Dept. Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012.	Member
7	Dr. Sandeepan Mukherjee Scientific Officer and HOD, Department of Virology Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012.	Member
8	Dr. Ashish Asrondkar Scientific Officer and HOD, Department of Chemotherapy Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012.	Member
9	Dr. Vrushali Patil Scientific Officer and Incharge Department of Training Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012.	Member

EXECUTIVE COMMITTEE		
2022-23		
10	Smt. Priyanka Ghag Assistant Accounts Officer, Finance Department, Addl. Charge Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012. (01/04/2022 to 15/06/2022)	Member
	Shri. Shantaram Barkade Accounts Officer, Finance Department Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012. (16/06/2022 to 31/03/2023)	Member
11	Shramik Utkarsha Sabha President/Secretary, (Workers' Union Representative)	Member
12	Dr. Usha Padmanabhan Chief Administrative Officer, Addl. Charge Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012. (Period 01.04.2022 to 21.02.2023)	Member - Secretary
	Shri. Sharad Makane Chief Administrative Officer, Addl. Charge Haffkine Institute for Training, Research and Testing, Parel, Mumbai - 400 012. (Period 22.02.2023 to 31.03.2023)	Member - Secretary

Administration

2022-23



Dr. Usha Padmanabhan

Additional Charge as
Chief Administrative Officer
01/04/2022 to 21/02/2023



Mr. Sharad Makane

Additional Charge as
Chief Administrative Officer
22/02/2023 to 31/03/2023

Overview

As per Memorandum of Association, the Minister, Medical Education, Government of Maharashtra is Ex-Officio president of the Governing Council and Minister of State, Medical Education is ex-officio Vice-President of the Governing Council. The Governing Council meets once/twice a year and given direction for smooth functioning and progress of the Institute. All other members of the governing council are Ex-Officio members of Government of Maharashtra like Secretary, Medical Education, Director, Medical Education Commissioner, Food and Drugs Administration and a representative from Health department, Government of India, which is considered to be a think tank of the Institute. 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 found fit.

Administration Department maintains 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. All the Correspondence received in the institute is routed through the Department. Maintenance of facilities like digital communication is done by Admin. Liaisoning with PWD civil as well as an Electrical helps other department functioning smoothly. After ISO audit the record maintenance system has been improved.

Accounts Section which works under Administration Department also maintains all the books of accounts of the Institute in electronic format. It also maintains records of all the grants received by the Institute for various research project from ICMR, IDSP, DBT and DST, apart from grant in aid received from the Government of Maharashtra. All the accounting is done digitally by accounting software, which facilitates monitoring institute's financial position. Though the payment of salary to staff is received from Treasury office, Thane through Directorate of Ayurveda, the pay bills are prepared and record is maintained at the Institute level. Stores Section which also function under Administration Department, procures all consumables, chemical, reagents, plasticware and glassware items and distributes to all the departments as per their requirements. It also procures all the local and imported Scientific Instruments for various departments of the Institute. The Store department also ensures maintenance of Instruments. Civil and electrical maintenance of the Institute is done by P.W.D, Government of Maharashtra.

Chief Administrative Officer



Research

Research Projects

1. Establishment of National Venom Research Centre in Haffkine Institute

Funding Agency - DHR (Department of Health Research), New Delhi

Budget - Rs. 24.28 CR

This Project is in Progress.

2. National One Health Programme for Prevention and Control of Zoonoses (NOHP-PCZ)

Team: This is an Institutional project involving Department of Virology,
Department of Zoonosis, Department of Biochemistry, and Department of Training.

Funding agency: National Centre For Disease Control.

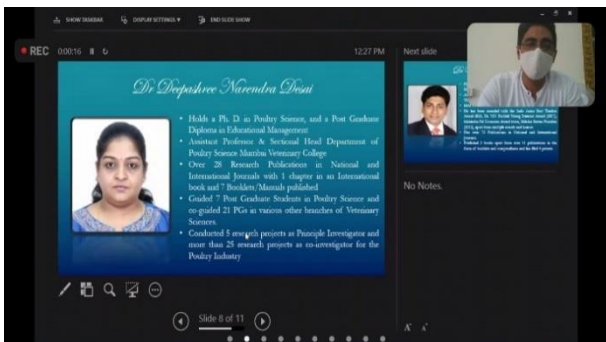
Budget – Rs. 24,00,000/-

Duration - January 2020 till present

Abstract:

Zoonotic Diseases have emerged as a major cause of Public Health concern over the past two decades of the 21st Century. A majority of these diseases – like Rabies, Leptospirosis, Brucellosis, Scrub Typhus etc. - have caused many episodic outbreaks in Urban, Semi-Urban and Rural parts of the country. Timely detection and creating awareness amongst all stakeholders i.e. the Government, the Medical, Veterinary and Animal Health and the Public in general is critical to control, prevention and management of these conditions. With this view, the National Centre for Disease Control (NCDC) under the aegis of the MoHFW, Government of India, has identified Haffkine Institute as one of the Regional Coordinators under the National One Health Program for Prevention and Control of Zoonosis (NOHPPCZ)

the flagship program of the Division of Zoonotic Disease Program (DZDP), NCDC. We are working as coordinator for the states of Maharashtra, Chhattisgarh, and Goa. As a part of this program in 2022-2023 we conducted 2 webinars – one on World Zoonosis Day and one on World Rabies Day. We also conducted 2 Hands on Training Workshops for Laboratory detection of Rabies for Public Health Personnel from the states of Maharashtra and Chhattisgarh and Goa respectively. Dr. Atul Goyal, Director General of Health Services and Director NCDC has visited the Haffkine Institute on 10th March 2023. We conducted a Stake Holders meeting for ZERO Rabies in the Mumbai Metropolitan region and a one State Zoonosis Committee Meeting. We plan to perform the testing and training activities under this program in the coming year.





Bacteriology

Bacteriology

2022-23



Dr. Anuya Rege

Head of the Department

Overview

Department of Bacteriology is the oldest department of the Haffkine Institute. Since its beginning, the department has been involved in research to tackle problems of immediate concern to public health. In 1896, plague broke out in Bombay in an epidemic form. Dr. Haffkine was invited by the Government to investigate the causes of the plague epidemic and to develop a prophylactic. He started his work in one of the rooms of the Petit Laboratory of Grant Medical College and this was the beginning of the Department of Bacteriology, with the main function of producing plague vaccine. In the year 1947, the Department of Bacteriology- then known as 'Vaccine Department'-supplied 23.5 million ml of plague vaccine, the highest in the history of the Institute. Department gradually undertook the production of Cholera & T.A.B. vaccines. The year 1963 saw the historic peak of supply of 23.5 million ml. of cholera vaccine.

Currently, it provides testing facilities for carrying out Bacteriological examination of water samples from various industrial and household sources. Besides, departmental testing activities also involve Testing of water purifying systems & Air sterilizers, antimicrobial efficacy testing of sanitizers, disinfectants, antimicrobial coated/incorporated material as well as synthetic and herbal preparations.

Furthermore, department provides guidance and Research facilities to M.Sc. / Ph.D. candidates and Short Term Research Interns (STRIP students).

Department has initiated research projects on Antibacterial & Antibiofilm activities of natural products.

Dr. Anuya Rege



Department Photograph

NABL Training Program 2022



TIFR Lecture 2022

मराठी भाषा पंधरवडा २०२३



Nehru Science Centre Exhibition 2023



Dr. Rege with her STIP 2022 Student

वाचन प्रेरणा दिवस २०२२



मराठी भाषा पंधरवडा २०२३



1. Determination of Antimicrobial and Anti-Biofilm activities of Alum and its *Bhasma*- An *In vitro* Comparative Study.

Team:

- Miss. Susan Martin (STRIP Student, Bacteriology Department)
- Mrs. Dipti Kolte (Bacteriology Department)
- Dr. Anuya Rege (Mentor, Bacteriology Department).

Funding Agency: Haffkine Institute (STRIP Fee)

Duration: January 2022 – June 2022 (STRIP Batch- II)

Abstract

With an approaching antibiotic crises due to the emergence and extensive spread of antimicrobial resistance among bacterial agents, as well as to increasing number of patients with chronic and bacterial biofilm-associated infections, the naturally occurring molecules may become new sources of antibacterial and antibiofilm drugs for clinical usage. Hence, in the present *in vitro* study, Antimicrobial potential of Alum as well as its *Bhasma*- *Sphatika Bhasma* was evaluated against total 10 organisms, viz., 4 Gram Negative, 4 Gram Positive and 2 Fungi using various assays such as MIC, MBC/MFC and Agar Well Diffusion method. Alum as well as *Sphatika Bhasma* revealed broad spectrum Antibacterial activities inhibiting gram positive as well as gram negative organisms and moderate antifungal activities. Hence, Antibiofilm potential of Alum and *Sphatika Bhasma* was further evaluated against total 8 bacterial biofilms using crystal violet staining method. Antibiofilm effect of Alum was found to be in the order of *S. lutea* > *P. aeruginosa* > *E. coli* > *MRSA* > *S. typhi* > *B. subtilis* > *K. pneumoniae* > *E. faecalis*, whereas, Antibiofilm activity of *Sphatika Bhasma* was noted in the order of *P. aeruginosa* > *S. lutea* > *E. coli* > *K. pneumoniae* > *S. typhi* > *MRSA* > *B. subtilis* > *E. faecalis*.

Alum as well as *Sphatika Bhasma* also exhibited good Antioxidant potential which was estimated using DPPH method. Antimicrobial, Antibiofilm and Antioxidant effects of Alum and *Sphatika Bhasma* could be attributed to their Phenolic and Flavonoid contents. Overall, *Sphatika Bhasma* exhibited better Antimicrobial, Antibiofilm and Antioxidant activities than Alum.

2. Isolation and Identification of Hydrocarbon Biodegrading Bacteria from Soil Samples.

Team:

- Miss Sakshi Ajay Gupta (STRIP Student, Bacteriology Department)
- Mrs. Jayashree More (Mentor, Bacteriology Department)

Funding Agency: Haffkine Institute (STRIP Fee)

Duration: January 2022 – June 2022 (STRIP Batch- II)

Abstract

One of the major environmental problems today is hydrocarbon contamination resulting from the activities related to the petrochemical industry. Accidental release of petroleum products are of particular concern in the environment. Bioremediation is the promising technology for the treatment of these contaminated sites since it is cost effective and will lead to complete mineralization. Bioremediation functions basically on biodegradation. Understanding the process of biodegradation requires an understanding of the microorganisms and their pathways that make the process work. Several microorganisms, including fungi, bacteria and yeasts are involved in the biodegradation process.

This study focuses on finding indigenous bacterial species from soil samples capable of Hydrocarbon degradation and evaluating their biodegradability.

The steps included enrichment and isolation of hydrocarbon degrading bacteria, morphological and biochemical characterization, qualitative and quantitative assay for hydrocarbon degradation and 16S rRNA sequencing of microorganisms showing highest degradation of hydrocarbons. Biodegradation assay was performed for the isolates using methylene blue as a redox indicator. The color change from blue to colorless indicated positive result as bacteria were able to metabolize the hydrocarbon (BTEX). The qualitative assay was performed in 4 batches and 52 isolates were selected that showed the color change from blue to colorless. The quantitative assay was performed using multimode reader and UV-Vis Spectrophotometer. 11 isolates were selected that showed significant reduction in the absorbance reading after performing quantitative analysis. In the biochemical tests HDB09, HDB10, HDB16, HDB17, HDB 32, HDB49, HDB50 and HDB52 were found to be oxidase positive suggesting that these isolates may be of *Pseudomonas*. However, gene sequencing and vi-tek analysis can be performed for the accurate identification. DNA samples were obtained from the isolates that showed significant reduction in absorbance. Form performing DNA extraction and the samples were outsourced for sequencing. The sequencing results were used to perform the BLAST where organism was identified to be *Enterobacter* spp.

In this study, it can be concluded that the hydrocarbon degrading bacteria were present in soil samples which can be isolated by simple microbiological methods. This biodegrading capacity of these isolates can be confirmed by performing biodegradation assay. The concentration of hydrocarbon can be analysed by Gas Chromatography. Further optimization study on hydrocarbon degrading bacteria can be carried out by varying the parameters such as concentration of hydrocarbons, temperatures and pH. However, gene sequencing and vi-tek analysis can be performed for the accurate identification of remaining isolates.

3. *In vitro* Evaluation of Antibacterial & Antibiofilm Potential of Alum (*Sphatika*) and it's *Bhasma* (*Sphatika Bhasma*)

Team:

- Miss Mrudali Ambre (STRIP Student, Bacteriology Department),
- Mrs. Dipti Kolte (Co-Mentor, Bacteriology Department) and
- Dr. Anuya Rege (Mentor, Bacteriology Department).

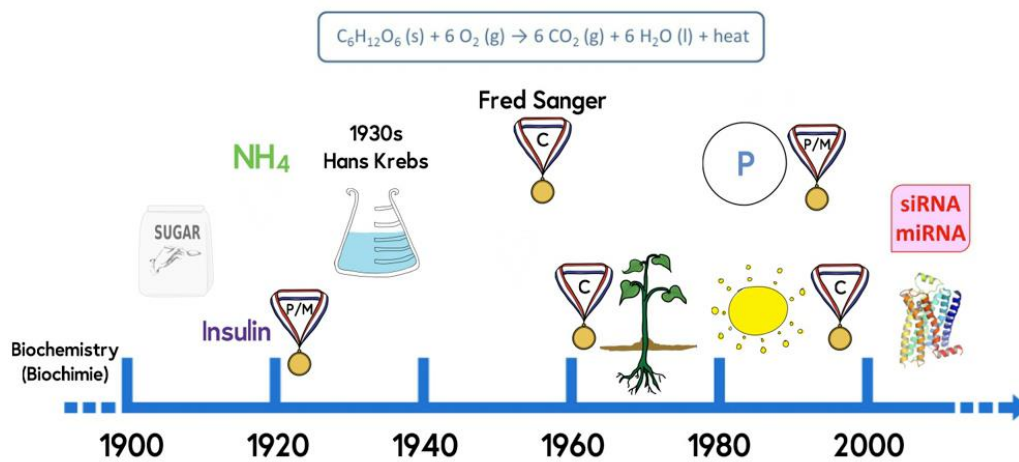
Funding Agency: Haffkine Institute (STRIP Fee)

Duration: January 2023 – June 2023 (STRIP Batch- II)

Abstract:

In the present *in vitro* study, Antibacterial and Antibiofilm effects of Alum and it's *Bhasma* would be evaluated against six gram negative bacteria using various assays. (Work is in progress)

Timeline of Biochemistry



Biochemistry



Dr. Usha Padmanabhan
Head of the Department

Overview

The Department of Biochemistry was established in 1923. The department is actively involved in basic and applied research, testing activities including pre-clinical cytotoxicity assays, snake venom and ASV testing, and training programs. Unique and novel testing services offered by the Department are chemical testing of honey and biochemical analysis of gall bladder and kidney stones. At present, various independent and collaborative projects focused on diseases prevalent in India are being pursued.

Understanding pathogenesis of the diseases at molecular level would aid in better management of the diseases at different levels, i.e., diagnosis, therapy and prognosis. Screening of traditional medicinal formulations and synthetic compounds for therapeutic activities using 'in vitro' and 'in vivo' techniques forms an integral part of the departmental research activities. Pharmacological studies on traditional medicines will enable their wider acceptance and will also result in finding novel applications. The department would like to focus more on clinical research with public health implications.



Department Photograph

1. To isolate various Subunits of various kinds Venom of (Indian big four) and understand antigenicity against ASVs

Team:

- Dr. Usha Padmanabhan
- Dr. Amruta Naik
- RA (to be recruited)

Funding Agency: DHR (NVRC funding)

Abstract

Cobra, Russell's viper, krait and saw-scaled viper are the Indian big 4 venoms. The most common sea snake along the Indian coast, is the hook-nosed sea snake (*Hydrophis schistosa*). Then come two other species, the annulated sea snake (*H. cyanocinctus*) and Malacca sea snake (*H. caeruleus*). There is no antidote available specifically for sea snake venom.

Snake venoms are complex mixtures of enzymes and proteins of various sizes, amines, lipids, nucleosides, and carbohydrates. Venoms also contain various metal ions that are presumed to act as cofactors and include sodium, calcium, potassium, magnesium, and zinc. Polypeptide toxins (molecular weight 5-10 KDa) include cytotoxins, cardiotoxins, and postsynaptic neurotoxins (such as α -bungarotoxin and α -Cobratoxin), which bind to acetylcholine receptors at neuromuscular junctions. Viperid venom contains 80-90% elapid venoms 25-70% enzymes (3-150 KDa) of, which damage vascular endothelium.

There are 4 manufacturers of antivenom in India. High quality snake antivenoms are the most effective treatment to prevent or reverse most of the venomous effects of snake bites. Another issue is that the amount of antivenom used for treatment also needs to be standardized since in most cases, there is a overuse of antivenom leading to unwanted sideeffects in patients.

This project aims to isolate subunits / peptides/ enzymes present in snake venom and identify which the leading antigen in snake venom and if possible standardize the dose of antivenom for neutralization of each venom type.

The project has been approved by the expert committee overseeing the NVRC project and Biosafety committee.

2. To evaluate occurrence of snake bites and effectiveness of mitigation measures in the State of Maharashtra

Team: Dr. Usha Padmanabhan and Statistician

Funding Agency: DHR (NVRC funding)

Abstract

Under-reporting of snake bite incidence and mortality is common. In Nepal, for example, where 90% of the population lives in rural areas, the Ministry of Health reported 480 snake bites resulting in 22 deaths for the year 2000, yet figures for the same year collected in a community based study of one region (Eastern Nepal) detailed 4078 bites and 396 deaths. Likewise, a very large community-level study of snakebite deaths in India gave a direct estimate of 45 ,900 (99% CI: 40,900-50,900) deaths in 2005, which is over 30 times higher than the Government of India's official figure. Revised estimates based on verbal autopsies and other data now suggest that as many as 1.2 million Indians died from snakebite envenoming between 2000-2019 (average of 58,000/year). A comparison of hospital-registered deaths in one district of Sri Lanka to data from the Registrar-General's office on deaths demonstrated that 62.5% of deaths from snakebite envenoming were not reported in hospital data.

Most deaths and serious consequences of snake bites are entirely preventable by making safe and effective antivenoms more widely available and accessible. The project aims to collect data from all PHC, SHC and THC in the State of Maharashtra with help from Public Health and MEDD to understand whether snake bites are being underreported and if so by how much.

The project has been approved by the expert committee overseeing the NVRC project and Biosafety committee and we have received permission from Public Health department, GoM

3. Assessment of bioavailable iron from herbometalic preparations.

Team:

- Dr. Amruta Naik,
- Collaborator: Dr. Aditi Kulkarni, Podar medical college, Mumbai.

Funding Agency: Intramural

Abstract

Anaemia is one of the major abnormality found in India, irrespective of age and gender. In Ayurveda, it has been mentioned that the herbometalic preparations are helpful in the treatment of the anaemic conditions. The bioavailability of the iron from these ayurvedic drugs is yet not estimated and hence in this study the actual uptake of the iron from these formulations will be studied using a cell line model.

Introduction

Therapeutic dosage of herbometalicAyurvedic drugs is very small and still these substances when used are really effective. Each herbometalic preparation is a composite of herbal ligands and molecule of iron. Hence the spectrum of action is enhanced in the conditions like anaemia. This aspect of therapeutics calls for the need to investigate the actual uptake of iron content of these formulations by cells. Hence it is need of an hour to take up the study to estimate the bioavailability of different herbometalic formulations. Actual iron uptake by cells from the herbometalic formulations has not yet been studied. Thus, this study has focus on the investigation of iron bioavailability from eight different herbometalicAyurvedic drugs.

Objectives

- To estimate the iron uptake by the cell line model from study drugs.

*The project has been approved by the IBSC.

Project has been approved by the external expert, Dr. PravinShingare (ex Dean, Directorate of Medical Education & Research & presently Vice Chancellor, Krishna Institute of Medical Sciences, Karad).

Project has been approved by Institutional Biosafety committee, Haffkine Institute.

4. Estimation of Anti-diabetic Potential of Ayurvedic Metallic Formulation.

Team:

- Dr. Amruta Naik,
- Collaborator: Dr. Aditi Kulkarni, Podar medical college, Mumbai.

Funding Agency: Once the MOU signed it will be submitted to AYUSH.

Abstract

Type 2 diabetes (T2D), which is much more common, is primarily a problem of progressively impaired glucose regulation due to a combination of dysfunctional pancreatic beta cells and insulin resistance. Diabetic nephropathy is reported to be responsible for 25% of mortality in diabetes mellitus as it is a major sequel of diabetes mellitus, leading to end stage renal disease. Identification and assessment of therapeutic potential of natural compounds have been led to the discovery of innovative and economical drugs to treat several diseases, including diabetes.

Suvarna Raj Vangeshwar is an Ayurvedic metallic formulation prepared using Kupipakwarasayana method. In clinical practice, it is used by Ayurvedic practitioners in conditions Prameh or Meha which is correlated with diabetes mellitus. In vitro cell based assay is an appropriate and inexpensive method for understanding of anti-diabetic action of compound. Various medicinal plants has been explored so far with respect to their anti-hyperglycemic activity but very less work has been done so far on the herbometalic preparations with respect to anti diabetic potential. Hence, in this proposed study the anti-hyperglycemic effect of the Suvarna Raj Vangeshwar will be monitored to understand it's mode of action.

Introduction

Diabetic nephropathy (DN) or diabetic kidney disease refers to the deterioration of kidney function seen in chronic type 1 and type 2 diabetes mellitus patients. The progression of the disease is known to occur in a series of stages and is linked to glycemic and blood pressure control. Till now a medicine which can reverse glomerular damage and has a reno-protective effect in DM cases is not available. In such conditions one has to depend on a stringent glycemic and blood pressure control. Meha resembles Micro-albuminuria, which is a characteristic feature of diabetic nephropathy. Meha is a one of the therapeutic target of Suvarna Raj Vangeshwar (SRV). Hence, it may prove to be the one to induce the anti-hyperglycemic effect. Therefore, there is a possibility that it might be effective in DM conditions with respect to its anti-hyperglycemic effect. Thus, the current study is aimed at investigating the anti-diabetic ability of a SRV by using in vitro assays where the anti-hyperglycemic capabilities of this formulation will be monitored.

Objectives

- To estimate the anti-hyperglycemic activity of SRV *in vitro*.

*The project has been approved by the IBSC and external expert.

Project has been approved by the external expert, Dr. Pravin Shingare(ex Dean, Directorate of Medical Education & Research & presently Vice Chancellor, Krishna Institute of Medical Sciences, Karad).

Project has been approved by Institutional Biosafety committee, Haffkine Institute.

5. Effect of Snake Venom on Human Cells.

Team:

- Dr. Amruta Naik,
- Collaborator: Dr. Usha Padmanabhan.

Funding Agency: DHR (NVRC funding)

Abstract

Snake venoms have evolved a wide diversity of peptides and proteins that induce harmful inflammatory and neurotoxic effects including severe pain and paralysis, hemotoxic effects, such as hemorrhage and coagulopathy, and cytotoxic/ myotoxic effects, such as inflammation and necrosis. Although sufficient in most cases, snakebite treatments have been challenged by the continuous high numbers of clinical illness and mortality associated with snakebites worldwide. Chronic morbidity following snakebites have been underestimated, with many victims reporting chronic symptoms in the bitten region, including complex regional pain syndrome and musculoskeletal disabilities. Available snakebite treatments face challenges associated with high incidences of adverse reactions along with poor efficacy against local tissue effects. Therefore, there is a need of more research work directed to the development of more effective snakebite therapies which will enable to overcome severe acute and chronic effects caused by snakebites. Understanding the cellular mechanisms of how the venom act especially at the bite site will help to identify ways to prevent severe complications of the snake bites e.g. tissue destruction. Therefore, this study focus on the determination of events that underlie cellular exposure will help to identify pathways perturbed by crude venom explain some of the pathological effects observed in local

envenomation. Data obtained from this study may serve as the basis for diverse translational research for the utilization of snake venom in the therapeutics.

Introduction

Envenomings result in death or severe morbidity in humans and, despite advances in management, snakebite remains a major public health problem, particularly in developing countries. Consequently, the World Health Organization recently recognized snakebite as a neglected tropical disease that affects ~2.7 million p.a. The biological effects induced by snakebite are currently treated with intravenous administration of anti-venom in combination to analgesics, fluid therapy, hemodialysis and/or antibiotics. Cellular pathways triggered by the venom and its toxins are still poorly understood. It is a need of time now to provide a better understanding of action mechanisms and effects and to highlight their undetermined targets and potential novel therapeutic targets that might have implications for improving the treatments of snakebites. Snake venoms are complex natural secretions comprised of hundreds of different molecules with a wide range of biological functions & actions. Hence in order to explore these for their utilization in biomedical sciences it is also important to explore their effects at cellular level. Thus, this study is focused on the effect of Indian big four snake venom i.e. Cobra, Russell's viper, krait and saw-scaled viper venom on human cells of various tissues / organs origin.

Objectives:

- To estimate the induction of cell death by snake venom in human cells.
- To monitor the effect of snake venom on cell death markers in human cells.

The project has been approved by the review committee of NVRC and IBSC.

6. Optimization of Genome sequencing of nSARS Cov2

Team:

- Usha Padmanabhan,
- Priyanka Gupta,
- Amruta Naik,
- Sameer Patil,
- Sanika Parkar,
- Shashank Sarang,
- Pravin Shirsat

Team from BCG trial:

- Dr. Sonali Salvi (MD),
- Dr. Sanjay Mukherjee (IAS),
- Dr. Rohidas Borse (MD),
- Dr. Sameer Joshi (MD),
- Dr. Rajesh Deshmukh (IAS)

Funding agency:

Haffkine Institute funds,

CSR funds from M/S Icertis International & M/S Smith & Nephew

Received by Dr. Usha Padmanabhan and DPDC funds to Department of Cell biology

Abstract

The project was aimed at identifying new emerging variants of the Corona virus through genome sequencing and becoming part of INSACOG. The project was submitted to the IEC, Haffkine Institute under the title “Determination of sequence of SARS Cov-2 variants & establishment of Internal SARSCov-2 Database for accuracy of variants of calling”.

The samples initially used were from Phase II Clinical Trial to assess BCG as a therapeutic potential for Covid-19. Permission for the same was granted by the Ethics committee of BJ Medical & Sassoon General Hospital, Pune.

Introduction

Global human health is increasingly challenged by emerging viral threats. In late December 2019, a new Beta- coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), appeared from the Chinese city of Wuhan and was later confirmed as the causative agent of a new severe form of pneumonia, coronavirus disease 2019 (COVID-19) [1]. The COVID-19 pandemic in India is a part of the worldwide pandemic of COVID-19. As of 4 May 2022, according to official figures, India has the second-highest number of confirmed cases in the world (after the United States of America) with 43,088,118 [2, 3].

SARS-CoV-2 consists of a positive-sense single-stranded RNA genome, spanning 29,903 nucleotides in length, and four structural proteins: N, S, E, and M.. The N (nucleocapsid), protein encapsulates the genome, while the S (spike), E (envelope), and M (membrane) proteins comprise the surrounding lipid bilayer envelope As shown in figure-1 [4], the genome size of SARS Cov-2 is approx. ~ 30 kb.

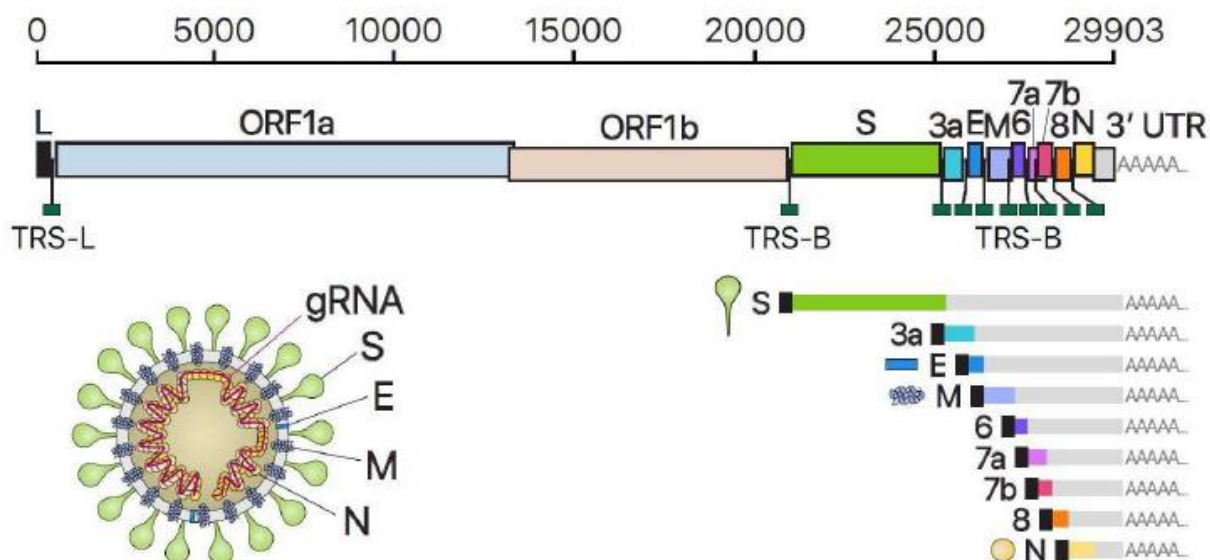


Figure-1 Schematic presentation of the SARS-CoV-2 genome organization, the canonical subgenomic mRNAs, and the virus structure. Taken from Kim et al., 2020 [4].

Over the past 2 years from 2020 several variants of SARS Cov-2 have been identified [5].

These mutations and Variants of Interest have been identified through whole genome sequencing (WGS) of the COVID-19 viral genome.

Globally, Genome sequencing of COVID-19 world is carried out by two methods: either via Illumina or through Nanopore. Among available sequencing technologies, nanopore-sequencing (Oxford Nanopore Technologies) could be an important cornerstone, as it is mobile, scalable, and Cost-effective.

Objectives

Our aim was to determine the Whole genome sequence (WGS) of SARS Cov-2 using easily deployable next-generation sequencers, the small and hand-held MinION sequencer with In-house setup using the samples from BCG Clinical Trial

Results

In our laboratory, we have standardized the Oxford Nanopore method of sequencing. In brief the method used is as follows:. The RNA genome is reverse transcribed and subjected to PCR using the 'midnight' split primer sets protocol which produce tiled overlapping amplicons(1200 bp), which cover almost the entire SARS-CoV-2 genome. Each sample is then tagged with a unique barcode (in the form of a DNA sequence). Adapters that target DNA to the nanopores are ligated. Finally the DNA is purified and loaded onto the MinIONflowcells. Downstream bioinformatics analyses are performed with the help of inter-ARTIC bioinformatics pipeline as recommended by Oxford Nanopore Technologies.

The results were published Sequencing data in the Genbank. accession details of published sequences in Genbank:OP132961.1, OP132962.1, OP132963.1 and OP132964.1

7. Standardisation of PCR and variant information from BRCA genes in Healthy females [Utilisation of left over blood Haematocrit from AMC].

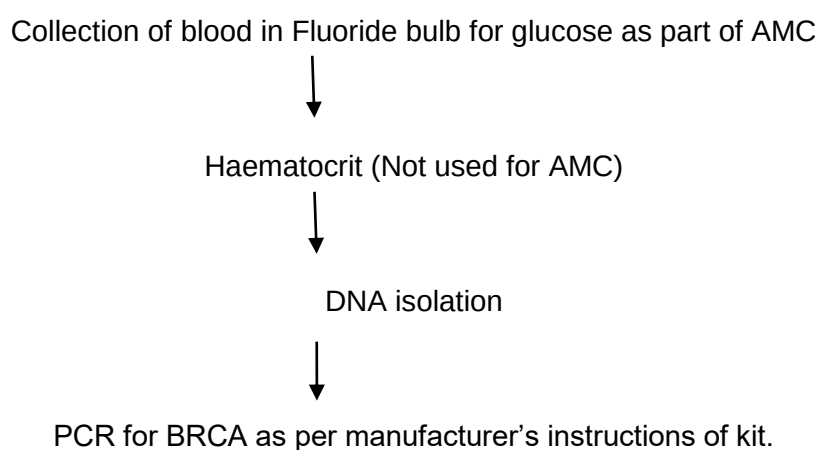
Team:

- Usha Padmanabhan,
- Amruta Naik,
- Sanika Parkar

Abstract

Haematocrit samples collected during annual medical check-up programme of Haffkine Institute for Training, Research & Testing will be utilized for the standardization of PCR testing for variant information for BRCA gene in healthy females after taking institutional ethics committee permission for the same.

The general procedure will be as follows:



This standardization will enable the department of Biochemistry to provide diagnostic testing at costs lower than private companies. (Attached cost information of other tests performed at the department and at private companies).

Introduction

The genes most commonly affected in breast cancer are the breast cancer 1 (BRCA1) and breast cancer 2 (BRCA2) genes. Normally, the BRCA1 and BRCA2 genes give protection against cancer but mutations in the BRCA1 and BRCA2 genes prevent them from working properly hence these mutations results to onset of cancer. Hence the early detection of these markers play vital role in the prevention / treatment of the breast cancer. Hence this study aims to standardise the PCR test for BRCA genes from the of annual medical check-up programme samples as this standardization will enable the department of Biochemistry to provide diagnostic testing for BRCA genes.

Objectives

- To Standardize the PCR go get the variant information from BRCA genes in healthy females.

8. Standardisation and Estimation of PSA (Prostate-Serum Antigen) in healthy males [Utilisation of left over serum from AMC].

Team:

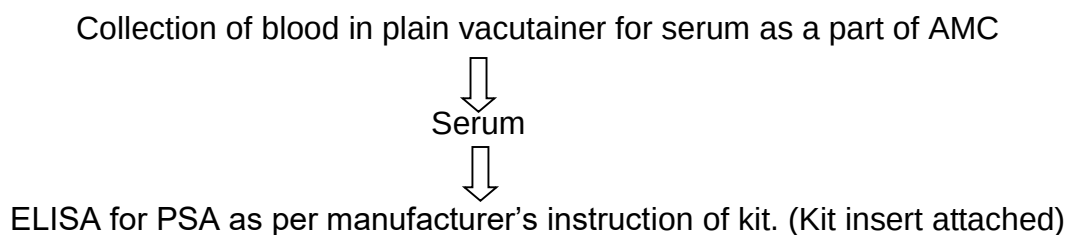
- Dr. Usha Padmanabhan
- Dr. Amruta Naik
- Mr. Sameer Patil
- Mr. Pravin Shirsat

Abstract

Serum samples collected during annual medical check-up programme Haffkine Institute for Training, Research & Testing will be utilized for the standardization and estimation of PSA in healthy males after taking institutional ethics committee permission for the same.

The data obtained from this study will be used for internal standardization process and for establishing potentially new diagnostic methodology/New testing procedure.

The general Procedure will be as follows



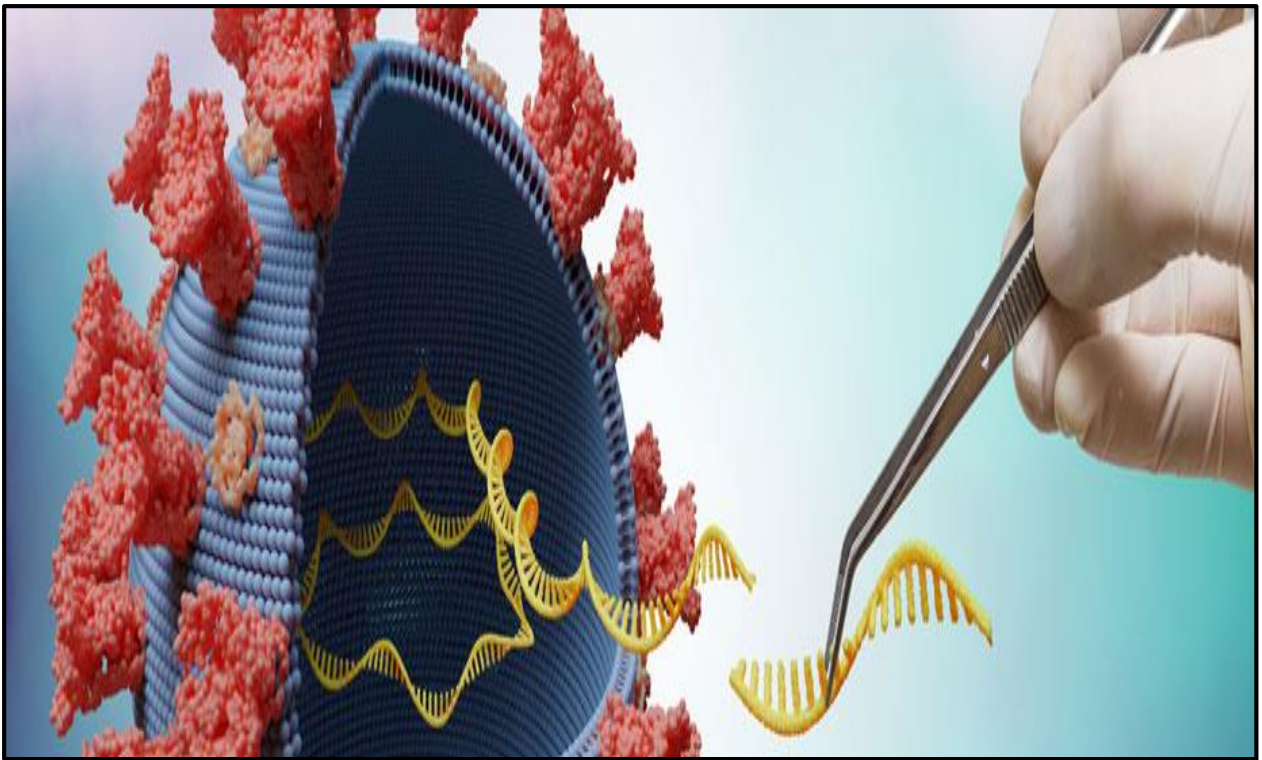
The standardisation will enable the department of Biochemistry to provide diagnostic testing at costs lower than private companies (Attached cost information of other test performed at the department and at private companies).

Introduction

Prostate specific antigen (PSA) is a 34 kD serine protease expressed on prostate gland. It is a clinical biomarker for prostate cancer as during prostate cancer progression, excess amounts of PSA are leaked into the blood dramatically elevating both PSA levels. Hence the early detection of these markers play vital role in the treatment of the prostate cancer. Hence this study aims to standardize the ELISA test for PSA from the of annual medical check-up program samples as this standardization will enable the department of Biochemistry to provide diagnostic testing for prostate cancer.

Objectives

- To estimation of PSA (Prostate-Serum Antigen) in healthy males.



Cell Biology

Cell Biology

2022-23



Dr. Usha Padmanabhan

Head of the Department

From 11/01/2017-15/10/2019 and

18/12/2020- till date

Overview

This department focuses on different aspects of cell biology and is in keeping modern approaches that are used in medicine. In accordance with the Institute's mandate of Training, Research & Testing the department makes its charter.

Testing

Over the past year, the department has initiated genome sequencing as a testing program for Novel Corona virus variant identification through Nanopore sequencing and hopes to expand the scope of this technology into prognostics and personalised medicine through identification of SNPs etc. The department wishes to get into small animal transgenic studies for commercial pre-clinical testing and research.

Research

The department will study (1) Basic cellular pathogenesis of infectious diseases such as modes of entry of pathogens into cells, amplification of pathogens at the systemic level and novel etiological agents (2) Cellular signalling mechanisms in non-infectious diseases such as oncogenic transformation of normal cells through acquisition of self-renewal properties and/or mutations and their progression to cancer (3) Developmental of organisms by studying spatio temporal effects of differentiation of stem cells in development of specific tissues and modulation of disease progression by pathogen induced alterations in stem cell differentiation programs which in turn causes changes in immunity.

Training

The department has initiated a new Training program called Advance research techniques (ART) which offers short internships for a period of 2-4 months and students are given hands-on training in techniques of protein and nucleic acid analyses, cell culture and in vivo egg development.

The department has participated in the Institutional training programs and has successfully trained 4 students (2020-21) and 10 students (2021-22) in the short term internship program, of whom 02 students have been placed and 02 have moved to get further education.

Over the past year, the department is affiliated to the University of Mumbai for M.Sc. in Applied Biology and Maharashtra University of Health Sciences in Applied Medical Biology for Ph.D. degree. Given the opportunity, the department wishes to train more students throughout the year in research methodology through short projects, as well as enroll students for M.Sc. and Ph.D. studies.

Dr. Usha Padmanabhan



1. Determination of sequence of SARS Cov-2 variants & establishment of Internal SARSCov-2 Database for accuracy of variants of calling

Team:

- Dr. Usha Padmanabhan
- Dr. Priyanka Gupta

Funding agency:

Haffkine Institute funds, CSR funds from M/S Icetis International & M/S Smith & Nephew received by Dr. Usha Padmanabhan and DPDC funds to Department of Cell biology

Abstract

The project was aimed at identifying new emerging variants of the Corona virus through genome sequencing and becoming part of INSACOG. The project was submitted to the IEC, Haffkine Institute under the title “Determination of sequence of SARS Cov-2 variants & establishment of Internal SARSCov-2 Database for accuracy of variants of calling”. 24 samples received by department of Virology were used to standardize the sequencing. Following the standardization, sequences were published at GenBank.

Introduction

Global human health is increasingly challenged by emerging viral threats. In late December 2019, a new Beta- coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), appeared from the Chinese city of Wuhan and was later confirmed as the causative agent of a new severe form of pneumonia, coronavirus disease 2019 (COVID-19) [1]. The COVID-19 pandemic in India is a part of the worldwide pandemic of COVID-19. As of 4 May 2022, according to official figures, India has the second-highest number of confirmed cases in the world (after the United States of America) with 43,088,118 [2, 3].

SARS-CoV-2 consists of a positive-sense single-stranded RNA genome, spanning 29,903 nucleotides in length, and four structural proteins: N, S, E, and M.. The N (nucleocapsid), protein encapsulates the genome, while the S (spike), E (envelope), and M (membrane) proteins comprise the surrounding lipid bilayer envelope As shown is figure-1 [4], the genome size of SARS Cov-2 is approx. ~ 30 kb.

Over the past 2 years from 2020 several variants of SARS Cov-2 have been identified [5].

These mutations and Variants of Interest have been identified though whole genome sequencing (WGS) of the COVID-19 viral genome.

Globally, Genome sequencing of COVID-19 world is carried out by two methods: either via Illumina or through Nanopore. Among available sequencing technologies, nanopore-sequencing (Oxford Nanopore Technologies) could be an important cornerstone, as it is mobile, scalable, and cost-effective.

Objectives

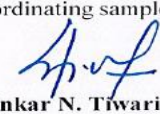
Our aim was to determine the Whole genome sequence (WGS) of SARS Cov-2 using easily deployable next-generation sequencers, the small and hand-held MinION sequencer with In-house setup using the samples from BCG Clinical Trial and standardize variant calling to become part of the Indian nSARS-COV2 genomics Consortium (INSACOG)

Results

In our laboratory, we have standardized the Oxford Nanopore method of sequencing. In brief the method used is as follows:. The RNA genome is reverse transcribed and subjected to PCR using the 'midnight' split primer sets protocol which produce tiled overlapping amplicons (1200 bp), which cover almost the entire SARS-CoV-2 genome. Each sample is then tagged with a unique barcode (in the form of a DNA sequence). Adapters that target DNA to the nanopores are ligated. Finally the DNA is purified and loaded onto the MinION flowcells. Downstream bioinformatics analyses are be performed

with the help of inter-ARTIC bioinformatics pipeline as recommended by Oxford Nanopore Technologies.

The Institute has been inducted into INSACOG vide Office memorandum (OM) No. RAD-22017/28/2020-KGD-DBT-Part (6) dated 30-12-2022 as shown below

Department of Biotechnology Ministry of Science & Technology Government of India *****					
File No: RAD-22017/28/2020-KGD-DBT-Part (6)	30 th December 2022				
<u>OFFICE MEMORANDUM</u>					
Subject: Expansion of Indian SARS-CoV-2 Genomics Consortium.					
In continuation of this Department, OM with File No.: RAD-22017/28/2020-KGD-DBT-Part (6) dated 15-11-2022, the Competent Authority of the Department of Biotechnology has approved the inclusion of the following institution (s) as new INSACOG Genome Sequencing Laboratories (IGSLs) in the Indian SARS-CoV-2 Genomics Consortium (INSACOG):					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">S. No.</th> <th style="width: 85%;">Name of the Institute</th> </tr> <tr> <td style="text-align: center;">1</td> <td>Haffkine institute for Training, Research & Testing, Mumbai</td> </tr> </table>	S. No.	Name of the Institute	1	Haffkine institute for Training, Research & Testing, Mumbai	
S. No.	Name of the Institute				
1	Haffkine institute for Training, Research & Testing, Mumbai				
2. Inclusion of this new INSACOG Genome Sequencing Laboratories (IGSLs) in the Indian SARS-CoV-2 Genomics Consortium (INSACOG) will be subject to the following:					
(i) Acceptance to the terms and conditions (Copy enclosed), and submission of the undertakings and other required documents within one-week time from the date of the issue of this OM. (ii) The IGSL has to ensure strict quality assurance measures to maintain data quality. (iii) Submission of undertaking/commitment for sequencing of at least a minimum number of samples per month. (iv) The laboratories will arrange funding from their respective parent agencies or from their own resources. DBT will not be providing any extramural grant for the purpose. (v) Any additional request by any of these IGSL for sequencing costs etc. may be referred to INSACOG for consideration subject to fund availability. (vi) The management strategy for all new IGSLs will follow a hub-and-spoke model, where the existing INSACOG labs will act as nodal points for the new labs and will be responsible for coordinating sample management and reporting as per the Management plan notified from time to time.					
 (Dr. Onkar N. Tiwari) Scientist 'F' Phone: 011-24361290					
<u>Copy to (for information and further follow up actions):</u> <i>Circulation by email</i>					
1. Director / Executive Authority / Nodal of the Institution listed in table above 2. INSACOG Co-ordinator (s) / Convener					
<u>Copy for information to:</u>					
1. Sr. PPS to Secretary, DBT, New Delhi 2. Dr. Sandhya R. Shenoy, Scientist-F, DBT, New Delhi					
 (Dr. Onkar N. Tiwari) Scientist 'F'					

2. Determination of variation in IGHV and IGLV gene in a healthy population

Team:

Dr. Usha Padmanabhan (PI),
Ms. Gauri Pradhan (former Ph. D Student),
Dr. Priyanka Gupta,
Ms. Bhupali Kore (Ph D student),
Dr. Sangeeta G (ART Student),
Ms. Dhanishta More (STRIP Student),
Ms. Ruchi Patil (STRIP Student)

Funding Agency: Haffkine Institute

Introduction

B cell chronic lymphocytic leukemia (CLL) is a cancer of the blood and bone marrow that is characterized by the accumulation of leukemic lymphocytes that co-express CD5, CD19, and CD23. The clinical course of CLL is extremely variable. Given the toxicities associated with currently available therapies, being able to predict which patients will need treatment plays a significant role in reducing morbidity and mortality [1, 2].

The four prognostic markers that currently are in common use in clinical practice are the following: (1) immunoglobulin heavy-chain variable region (IgVH) mutational status, (2) interphase fluorescence in-situ hybridization (iFISH) abnormalities (del(17p13), del(11q23), del(13q14), and trisomy 12), (3) CD38, and (4) zeta-associated protein (ZAP)-70 [3]

The immunoglobulin heavy chain variable region gene (IGHV) mutation status has been an established prognostic factor in patients with CLL. A cutoff of 2% deviation or 98% sequence identity to germline in

the IgHV sequence has been routinely used as a prognostic marker. Several studies demonstrated that patients with mutated IgVH respond better to chemoimmunotherapy, whereas patients with unmutated IgHV have a shorter time to treatment, shorter time to next treatment, inferior response to chemotherapy/chemoimmunotherapy, higher chemotherapy resistance rate, and lower survival rate. [4,5,6]

Duration of complete remission. In the FCR cohort, patients with CLL cells that used mutated IgVH (M-CLL) had significantly longer complete remission duration than did patients with CLL cells that used unmutated IgVH (UM-CLL) [6]

Proposed Methodology: This project aims to establish the baseline variation in IGHV and IGLV gene in a healthy Indian population. For this we will use haematocrit from blood samples drawn from institute employees for AMC. We are assuming that employees of the institute are healthy individuals.

In CLL patients, as 80-90% of all leukocytes in blood will be abnormal B cells, DNA is directly extracted from peripheral blood samples.

For healthy individuals, CD19 positive B cells will be isolated from the haematocrit samples. As per Agathangelidis et al, DNA extraction will be done from these isolated cells samples, PCR will target VDJ region for amplification and sequencing of IGHV/IGLV genes [7].

Expected outcome and future studies: To our knowledge, variations in IGHV and IGLV in an Indian population have not been studied. Our study will help establish the baseline variation in IGHV and IGLV gene in a healthy Indian population. We hope to compare this data with CLL patient data so that we can establish the method of diagnosis for CLL cancer patients at the Institute.

Project has been approved by the external expert, Dr. Pravin Shingare (ex Dean, Directorate of Medical Education & Research & presently Vice Chancellor, Krishna Institute of Medical Sciences, Karad). It is proposed that the project be carried out in collaboration with Krishna Institute of Medical Sciences, Karad.

Project has been approved from Institutional Ethics committee & Institutional Biosafety committee, Haffkine Institute.

3. Assessment of Tribal population in Maharashtra's Bhandara, Gondia & Gadchiroli districts: Awareness, Treatment Access and Seroprevalence survey for Rabies.

Team:

- Dr. Usha Padmanabhan (PI)
- Mr. Pawan Kumar Todkar, S.O. Department of Virology, (Ph D student)

Abstract

Rabies is a viral disease that affects the nervous system of mammals, including humans. The disease is caused by the Rabies virus, which is a member of the Lyssavirus genus of the family Rhabdoviridae. The virus is typically transmitted to humans through the bite of an infected animal, such as a dog, cat, or bat. Once the virus enters the body, it travels along nerve fibers to the brain, where it causes inflammation and damage to the nervous system. Without prompt treatment, rabies is almost always fatal.

In India, rabies is a significant public health concern, with an estimated 20,000 deaths reported annually, and Maharashtra state being one of the most affected regions.[3] In Maharashtra's tribal region, particularly the eastern Vidharbha region, is one such area where rabies is a significant public health concern. The region is home to a large population of tribal communities who are at a higher risk of contracting the disease due to their proximity to animals and lack of awareness about the disease and preventive measures.

Table No:-1 District-wise Population, Scheduled Tribe Population, and Forest Area with Demarcation Information in Maharashtra, India.

District	Total Population (2011)	Scheduled Tribe Population (2011)	Forest Area (sq km)	Forest Demarcation
Bhandara	1,200,334	88,336	3,276.58	Demarcated by the Forest Survey of India
Gondia	1,322,507	214,131	3,039.31	Demarcated by the Forest Survey of India
Gadchiroli	1,072,942	448,488	8,071.36	Demarcated by the Ministry of Environment, Forest and Climate Change

Project aims to assess awareness, vaccine penetration, primary health access and sero-prevalence in these areas. Project has only been tentatively framed and permissions are in the process of being sought.

4. Isolation of Monoclonal Antibodies from Rabies infected Horse Serum.

Team:

- Dr. Usha Padmanabhan (PI),
- Ms. Snehal Annadate (STRIP Student),
- Mr. Shantanu Dighe (ART Student)

Funding Agency: Haffkine Institute

Abstract

Rabies is a contagious and fatal zoonotic disease caused in humans by the Rabies virus (RABV), a member of the Lyssavirus genus (a virus form that causes encephalitis) belonging to the Rhabdoviridae family. It is one of the Neglected Tropical Diseases (NTD) that leads to lethal neurological damage and is estimated to cause approximately 59,000 deaths worldwide annually due to factors such as the existence of huge global rabies reservoirs and limited access to treatment.

The deaths can be controlled by following proper and timely Post Exposure Prophylaxis (PEP) consisting of wound cleaning, anti-rabies immunoglobulin (RIG) administration, and vaccination. However, due to poor supply across the world, high cost, and varying batch-to-batch quality of sera-derived immunoglobulins, many of the patients progress toward the clinical phase having a 100% fatality rate. The World Health Organization (WHO) advises treatment with both anti-rabies immunoglobulins and anti-rabies vaccine for Grade-III post exposure prophylaxis.

The literature so far summarizes the key features of the different available monoclonal antibodies against rabies, focusing on their application in post exposure prophylaxis and highlighting their potential in a novel therapeutic approach. The study mentioned that the development of an anti-rabies immunotherapy based on a cocktail of two broadly neutralizing monoclonal antibodies, RVC20 and RVC58 has been described in a preclinical study using mice. The use of these antibodies was successful at treating rabid mice even at later stage of the infection. This is the first in vivo proof of concept for a treatment of symptomatic rabies with monoclonal antibodies, which could be the premise of a new paradigm shift in the treatment of rabies in humans.

Other studies suggested that NP-19-9 and 11B6 are potent candidates to be used for PEP, suggesting further studies involving clinical studies in human. Currently, several anti-rabies virus monoclonal antibody (mAb) products are under development as alternatives to RIG, and two recently received regulatory approval in India.

5. Evaluation of a peptide inhibitor to rabies surface glycoprotein through in Silico analysis and Molecular dynamic simulations

Team:

- Dr. Usha Padmanabhan (PI, only for the part mentioned herein),
- Mr. Siddhivinayak Chinchalkar (ART student),
- Ms. Harshada Sawant (Ph. D Student),
- Dr. Ashish Asrondkar,
- Dr. Vrushali Patil (Co-I)

Abstract

There are no therapies for rabies except for post exposure prophylaxis with or without antibody treatment determined by the severity classification of the disease as demarcated by WHO guidelines. One possible method of countering this is through development of novel therapeutics. Such a project is being carried out by the department of Chemotherapy by Harshada under the guidance of Dr. Vrushali Patil. The rabies virus enters neuronal cells via docking of the surface glycoprotein with n-acetylcholine receptors on neuronal cells. In the project, they hope to design a peptide inhibitor which binds to the rabies surface glycoprotein and inhibits/prevents virus entry into cells. We entered into a collaboration with them, so that we could optimize peptide inhibitor sequence through in silico analyses and determine specificity using molecular dynamics.

Thus the following steps were carried out using multiple softwares:

1) Creation of pdb of the rabies glycoprotein, its hydration shell and determination of energy parameters (enthalpy and entropy). The rabies glycoprotein pdb file was created through homology modelling and was given to by Dr. V. Patil.

The structure of the rabies glycoprotein given to us was as follows:

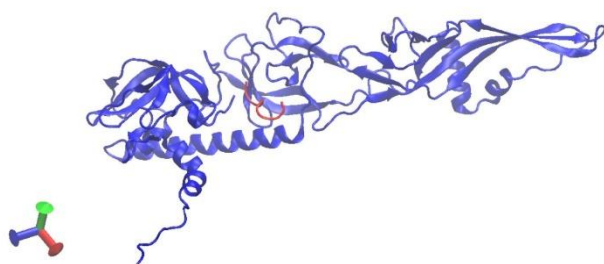


Figure 1: Structure of Rabies Glycoprotein as viewed in Pymol. This structure was generated by homology modelling

2) Creation of pdb of peptide-inhibitor, its hydration shell and determination of energy parameters. A pdb file of the peptide inhibitor was created through 2 softwares: 1. I-TASSER (10 to 1500 residues) and 2. Swiss PDB viewer. Since the I-TASSER software requires a minimum 10 amino acid sequence, the Swiss PDB viewer was used to generate the pdb structure of the peptide. But the constraint in this software is that it assumes an alpha helical structure for the peptide. A second confirmation of the peptide-inhibitor was generated by looking into the homology model.

The following figures show the potential tertiary structures that could be adopted by the peptide inhibitor

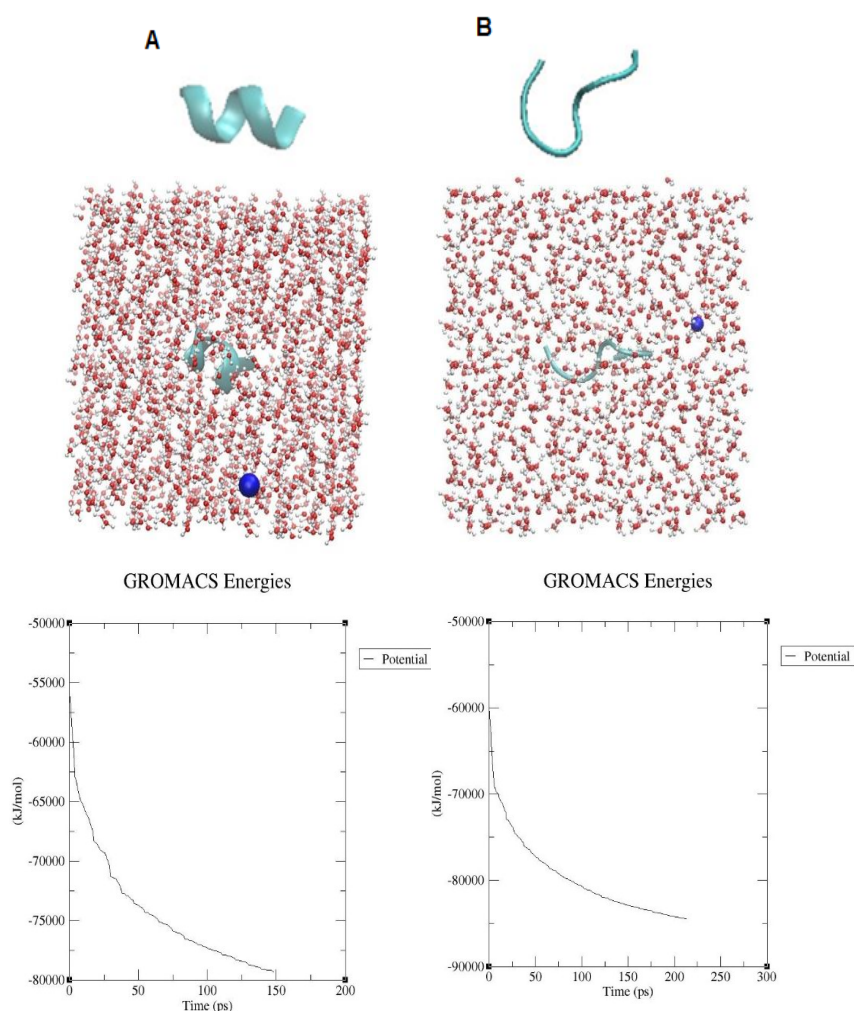


Figure 2: Confirmations of the peptide inhibitor

Panel 1 shows the different tertiary structures of the peptide-inhibitor as predicted by different softwares.

a) Swiss Pdb which assigns a alpha helical structure

b) Pdb extracted from original pdb file which assigns a beta loop structure

Panel 2 Shows the hydration shells around the peptides to estimate equilibrium energy in the 2 confirmations

Panel 3 shows the energy minimization of the same peptide inhibitor in the 2 different confirmations.

3) Docking of the glycoprotein and peptide inhibitor, its hydration shell and determination of energy parameters.

4) Determination of binding parameters from energy parameters as above. This is ongoing

5) Prediction of peptides with high specificity binding to glycoprotein. This will be carried out.

6. Plasmodium falciparum genomics: Standardization of target-based PCR and sequencing of genes involved in drug resistance and infectivity.

Team:

- Dr. Usha Padmanabhan (PI),
- Dr. Priyanka Gupta
- Ms. Sanajana Gupte (STRIP Student)

Team from Zoonosis:

- Dr. Mrunal Ghag Sawant,
- Ms. Trupti Satwekar
- Ms. Sheetal Shetty (MSc Student)

Funding Agency: Haffkine Institute

Abstract

Malaria is a global infectious disease that remains a leading cause of morbidity and mortality in the developing world, causing one million fatalities worldwide each year. The disease is mainly caused by *Plasmodium falciparum* that remains as dominant parasite and accounts for 50% of malaria cases.

Administration of antimalarial drugs remains the primary treatment for malaria infection. However, due to repeated drug administration, parasite strains have become resistant to almost all antimalarial drugs used hampering disease management.

The project evolved as a result of discussion with Dr. Mrunal Ghag Sawant who has observed decrease in infectivity of *Plasmodium* strains with increase in passage number. Thus, the aim of the study initially was to develop and standardize target-based PCR and sequence genes involved in host infectivity and study accrue ment of mutations leading to loss in infectivity. This project was later expanded to develop,

standardize target-based PCR and sequencing of genes involved in drug resistance from the *Plasmodium falciparum* genome.

In vitro culturing of *Plasmodium falciparum* in erythrocytes, isolation, and purification of Parasite DNA by three different cell permeability methods, Primer designing and analysis of drug resistance genes were established. The optimum conditions for standardization of CRT, MDR1, Atpase6 and Cytb drug resistance genes were carried out. However, standardization of Cytb gene resistance to Atovaquone was determined.

Sequencing of these genes of the organism will be carried out once all gene targets are PCR amplified successfully.

Results:

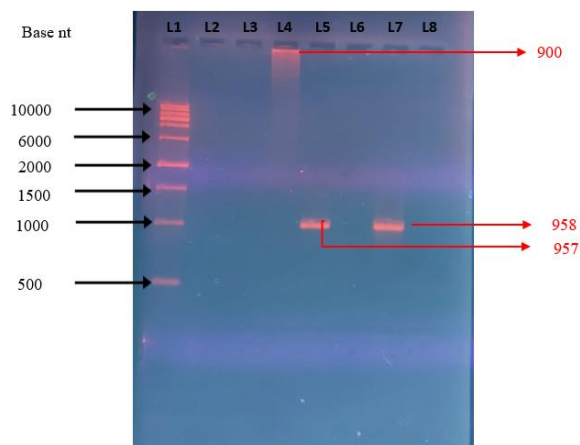


Figure 1: Agarose Gel Electrophoresis (1.2%) showing results of target-based PCR conducted for amplification of PfMDR1 and PfCytb genes of *Plasmodium falciparum*.

Sequencing is expected to be carried out soon.

7. Standardization of Target based PCR for sequencing of measles.

Team:

- Dr. Usha Padmanabhan (PI),
- Dr. Priyanka Gupta
- Mr. Shubam Singh (STRIP Student)

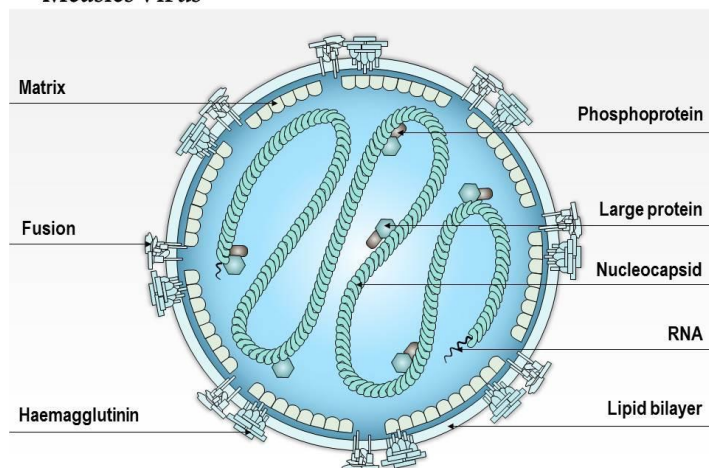
Funding Agency: Haffkine Institute

Abstract

Measles is an acute viral illness caused by a virus in the family paramyxovirus, genus Morbillivirus. Measles is characterized by a prodrome of fever and malaise, cough, coryza, and conjunctivitis, followed by a maculopapular rash. Measles is usually a mild or moderately severe illness. However, measles can result in complications such as pneumonia, encephalitis, and death.

Children in India receive their first dose of the measles vaccine when they are 9–12 months old and a second dose at 15–18 months. Ninety-five per cent of children need to have received both doses of the vaccine to achieve herd immunity, when enough people have antibodies against the virus to prevent the illness from spreading. Between 2019 and 2021, only 56% of children received the recommended two doses of the measles vaccine by the time they were 3 years old, according to the India's National Family Health Survey. As of November 2022, India had recorded 12,773 cases of measles this year, according to the World Health Organization, making it the largest outbreak in 2022, largely due to breakdown of vaccination programs due to the Covid-19 pandemic.

Measles Virus



Measles virus (MeV) is a negative-sense RNA virus with a non-segmented genome (Fig. 1b) and a lipid envelope that belongs to the *morbillivirus* genus of the family *Paramyxoviridae*. The **16 kb genome** encodes eight proteins in which six proteins are found in the virion. The envelope has surface projections of the viral **hemagglutinin**

(H) and **fusion glycoproteins (F)** with the **matrix protein (M)** lining the interior.

The helical nucleocapsid is formed from the genomic RNA wrapped with the **nucleocapsid protein (N)** and is packed within the envelope as symmetrical coil with the **phosphoprotein (P)** and **large polymerase proteins (L)**.

Due to the outbreak of Measles reported by leading dailies at the start of the semester, the project aimed to standardize target based PCR and sequencing of the measles genome for molecular epidemiologic purposes.

For the measles virus, genotype designations are considered the operational taxonomic unit, whereas related genotypes are grouped by clades. The WHO currently recognizes **8 clades, designated A, B, C, D, E, F, G, and H**. Within these clades, there are **23 recognized genotypes, designated A, B1, B2, B3, C1, C2, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, E, F, G1, G2, G3, H1, and H2**, and **1 provisional genotype, D11**. Viruses with related sequences within some of the genotypes (eg, B3 and H1) are referred to as clusters. The WHO recommends that the 450 nucleotides coding for the COOH terminal 150 amino acids of the nucleoprotein (N - 450) are the minimum amount of sequence data required for assigning a measles genotype.

For standardization purposes, we selected MMR (Measles, Mumps and Rubella) vaccine (Commercial name: Tresivac, Serum Institute of India). The vaccine contains the Edmonston-Zagreb standard measles viral strain.

Since the RNA is isolated from a CDSCO approved vaccine, there were Biosafety or Ethical issues.

Results

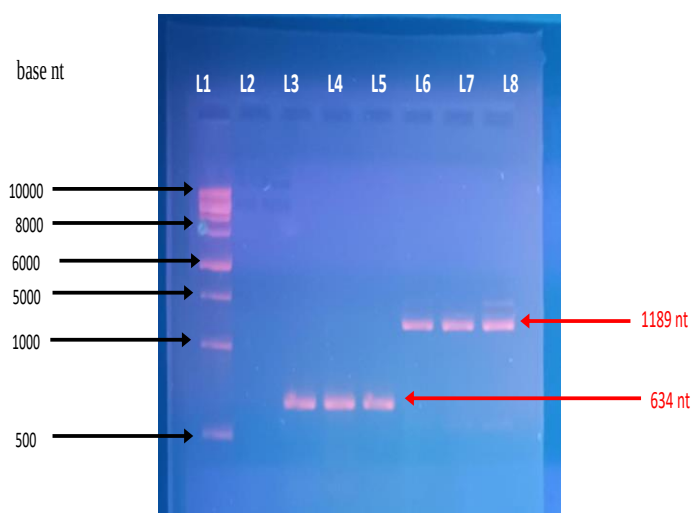


Figure 1. Agarose gel (1.5%) showing the results of three sets of target-based PCR conducted for the amplification of N450 and H-gene of measles.

Sequencing is to be carried out soon



Chemical Testing

Chemical Testing Department

2022-23



Mrs. Suvarna Pachpore
Head of the Department

Overview

Department of Chemical Testing is one of the older Department's in Haffkine Institute.

Chemical Testing Department is majorly involved in Testing of Alcoholic Beverages received from Maharashtra State Excise Department. This includes Country Liquor from Manufacturer, Country Liquor from Retailer, Indian Made Foreign Liquor (Vodka, Rum, Whiskey, Beer, etc) Toddy.

Apart from Alcoholic Beverages. Department is also involved in Testing of Denaturants for Liquor. As we know that besides consumption alcohol has wide applications in different fields like disinfectant, cosmetic, fuel, cleaning agent etc. In this case when alcohol is used for these purposes it is denatured with few chemicals to make it unfit for consumption. These denaturants are also tested in Chemical Testing Department.

Department also extends its services to perform alcohol content testing in cosmetics. During COVID 19 pandemic department has served in testing of sanitizers.

Department provides training to STRIP students in the field of Nanoparticles and Phytochemistry.

Two Training programs are conducted in department. They are as follows:

- 1) **Workshop on Testing of Alcoholic Beverages (TAB)** – This is a two day training program conducted in various batches every year during March to June. Rating received for this course is usually Very Good to Excellent.
- 2) **Short Term Research Internship Program (STRIP)** – This program provides research platform to students for a period of few months.

Chemical Testing Department is a Maharashtra FDA approved Department.

Mrs. Suvarna Pachpore



Department Photograph



Testing of Alcoholic Beverages and related Chemicals



Training Activity

Other Departmental Activities

- 1) Lecture delivered during Science Exhibition at Nehru Science Centre
- 2) Audit by Foods and Drugs Administration Department
- 3) Staff gained NABL Training
- 4) Marathi Bhasha Din Celebration





Chemotherapy

Chemotherapy

2022-23



Dr. Ashish L Asrondkar
Head of the Department

Overview

The Chemotherapy Department is one of the oldest department in the Haffkine Institute. The department has been engaged in research to address issues of immediate public health concern since its inception. The Department of Chemotherapy is engaged in Training, Research & Testing activities.

Chemotherapy Department mainly focused on the synthesis of heterocyclic compounds for their putative medicinal benefits. Compounds have been synthesized and characterized through Analytical Instrumentation facility available in the department. The department of Chemotherapy uses green techniques to synthesize heterocyclic compounds (i.e. microwave irradiation). Department also focused on research using *in silico* drug designing tool. The Institute currently has a project approved by DHR, and the department forms part of the project.

The department has taken part in institutional training programs and trained students in the short-term internship programme. For M.Sc. and Ph.D. degrees, the department is affiliated to the University of Mumbai for the subject of Chemistry. The department has two registered guides for M. Sc. and Ph. D. degree from University of Mumbai.

1. Dr. Ashish Asrondkar - Registered Guide for M.Sc. and Ph.D. (Chemistry)
2. Dr. Vrushali Patil - Registered Guide for M.Sc. and Ph.D. (Chemistry)

Details of students of Ph.D. degree in Chemotherapy Department:

Sr No.	Name of the student	Degree	Guide Name	Current status
1	Miss Harshada sawant	Ph.D.	Dr. Vrushali Patil	Topic approved

For Science graduate and postgraduate students, the department offers a variety of short-term training programs lasting one month, 45 days, three months, and six months (STRIP). The department wants to increase the number of students trained in research techniques through short projects throughout the year, as well as enroll students in M.Sc. and Ph.D. programs.

Department has three FDA approved chemist for Chemical and Instrumentation section. The department provides testing facility on HPLC (High Performance Liquid chromatography), GCMS (Gas chromatography Mass Spectrophotometer), and IR (Infrared Spectrophotometer) samples on commercial & academic purposes. Recently department initiated two advanced training courses on HPLC and GCMS instruments.

1. Hands on Training on HPLC (Duration-1 month)
2. Advance training on GC-MS (Duration -1 month)

The department submitted a proposal for the establishment of a NABL accredited laboratory at Haffkine Institute for Training, Research and Testing. Medical Education and Drugs Department of Maharashtra government has praised and approved the project. District planning development committee (DPDC) Mumbai division funded instruments worth Rs 2.4 crore for the establishment of NABL lab at Chemotherapy department.

NABL Training Programme

Chemotherapy department initiated four days Training Programme on “General Requirements for the Competence of Testing & Calibration Laboratories and Internal Audit as per ISO/IEC 17025:2017” at Haffkine Institute for Internal Scientific Officer and Technical staff.

Dr Ashish Asrondkar (HOD) co-ordinated with Dr Gujarathi Sir, IDMEI for NABL Training.

NABL Team of Chemotherapy Department

Dr. Ashish Asrondkar

Dr. Vrushali Patil

Mr. Sushant Kaple,

Mrs Swati Sanap

Mr. Jitendra Dalavi

Mr. Rohan Patil

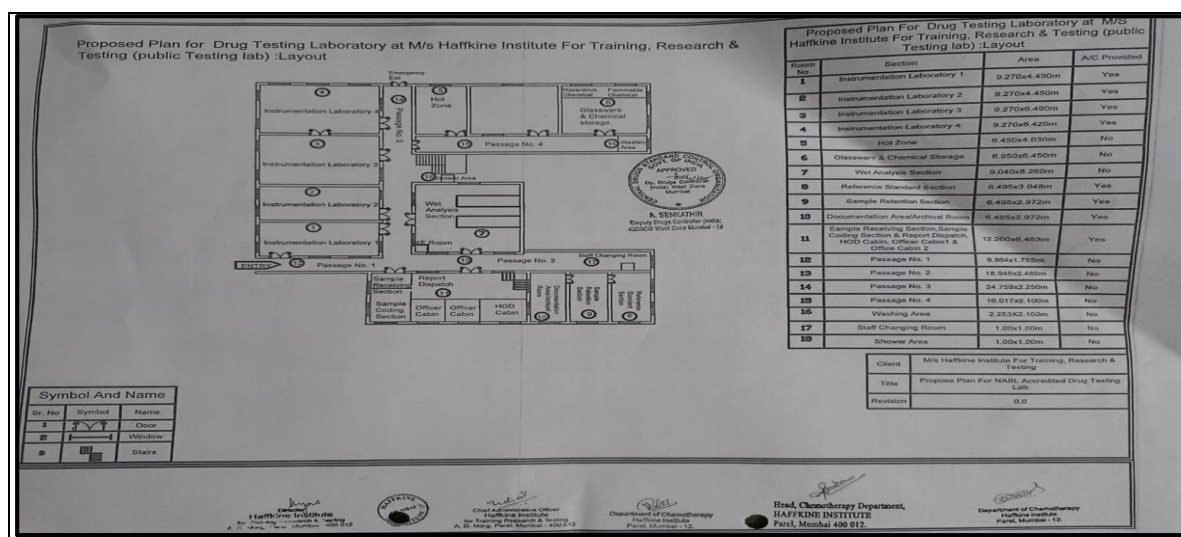
Mr. Maruti Chile



NABL Training Programme

The team standardized Drugs mentioned below with according to Indian Standard Pharmacopeia 2022

- a. Metformin Tablet
- b. Albendazole Tablet
- c. Aspirin Tablet
- d. Paracetamol Tablet
- e. Amitriptyline Tablet
- f. Ampicillin Tablet
- g. Atenolol Tablet
- h. Calcium pantothenate Tablet
- i. Cetirizine Tablet
- j. Diclofenac Tablet
- k. Erythromycin stearate Tablet
- l. Pyridoxine hydrochloride Tablet



The approved NABL floor plan for Chemotherapy Department

Future Plan

- To establish NABL accreditation laboratory
- Research on Peptide synthesis
- Testing of Drugs in a NABL accredited lab.

Dr. Ashish Asrondkar



Department Photograph

Departmental Projects 2022-23

1. Design, development, and biological assessment of Rabies using heterocyclic derivatives.

Team

- Dr. Vrushali Patil (P.I.)
- Ashish Asrondkar (Co-P.I.)
- Ms. Harshada Sawant (Ph.D. Student)

Funding Agency - Haffkine Institute

Duration - September 2021 – September 2025

Abstract

Rabies is a zoonotic disease that affects both humans and animals. It is caused by the RABV virus of the Lyssavirus genus, transmitted through the bite of infected mammals. Rabies is usually transmitted from the saliva of infected dogs. Currently, vaccination is only preventive treatment available against RABV virus. As it doesn't have any specific treatment till now, due to which the survival rate of the patient was very low. After clinical disease is developed, the death is fatal. In the light of the above anti-rabies agents are clearly needed. Ectodomain homo-trimeric spikes is responsible for fusion of the virus with host cells, it leads to increase in the activity of the virus. The proposed study, is aimed to develop heterocyclic derivatives and plant based derivatives to inhibit interaction between the rabies and drug moiety.

2. Synthesis of oligopeptide using Solid Phase Peptide Technique

Team

- Dr. Vrushali Patil (P.I.)
- Ms. Anushka Chavan (Strip Student)

Funding Agency - Haffkine Institute

Duration - November 2022 - March 2023

Abstract

Rabies is a life-threatening encephalitis neurotropic disease that affects humans and is caused by Rabies Virus RV which is a single stranded negative sense RNA. The rabies virus is from the mononegavirales order of Rhabdoviridae family. Rabies is a life-threatening encephalitis neurotropic disease that affects humans. This disease is caused by Rabies Virus RV which is a single stranded negative sense RNA. The rabies virus is from the mononegavirales order of Rhabdoviridae family. Rabies virus against therapeutic peptide, antiviral peptide, peptide against blood brain barrier, cell penetrating peptide and peptides against influenza is also studied. For in-silico studies different tools such as Swiss modeller, Protox, Marvin sketch, Admetsar and Lipinski rule tools were used. In-silico studies were carried out using the rabies protein and the potential ligand and the peptide synthesis was carried out by Solid Phase Peptide Synthesis where the amino acids were covalently bound to the inert polymeric solid support and those amino acids were extended by addition of more amino acid chain leading to the formation of peptide. The peptide synthesized was Glu-Lys-Ile using SPPS technique. Depending upon its binding affinity we decided to further proceed with the synthesis of this oligo-peptide chain using SPPS technique and its kinetic studies was estimated using HPLC technique and the protection and deprotection of amino acid was monitored through Kaiser test. The In-silico data showed positive results. The newly designed drugs were drawn in Marvin's sketch and saved in mol 2. The In-silico showed good results for toxicity prediction, Pharmacokinetic studies and Binding energy. The pharmacokinetic studies showed that the ligand passes the blood brain barrier. After undergoing the docking, the results shown had a high binding energy between the ligand and the modelled protein receptor. The binding affinity between them was -6.2 kcal/mol.

3. In-vitro Anti-inflammatory activity of 2-nitrothiazole.

Team

- Dr. Ashish Asrondkar (P.I.)
- Ms. Harshali Salvi (Strip Student)

Funding Agency - Haffkine Institute

Duration - November 2022 - March 2023

Abstract

Inflammation is a complex biological process that occurs in response to harmful stimuli, such as infection, injury, or tissue damage. It is a crucial part of the body's immune response, and is necessary for healing and repair. During inflammation, various immune cells are activated and chemicals called cytokines and chemokines are released. These chemicals cause blood vessels to dilate, allowing more blood to flow to the affected area. This increased blood flow brings more immune cells to the site of injury or infection, which helps to fight off pathogens that may be present. Infectious and non-infectious agents, as well as cell damage, activate inflammatory cells and activate inflammatory signalling pathways, the most common of which are the NF- κ B, MAPK, and JAK-STAT pathways. The aim of this study was to determine the anti-inflammatory activity of 2-nitrothiazole. The In vitro anti inflammatory activity of the compound was estimated by two assays i.e HRBC Membrane stabilization assay and Protein Denaturation assay and the % inhibition was calculated.

4. Design and Development of Apigenin Derivatives against RABV Virus.

Team

- Dr. Ashish Asrondkar (P.I.)
- Mr. Durgesh Mahajan (Strip Student)

Funding Agency - Haffkine Institute

Duration - November 2022 - March 2023

Abstract

Rabies is a zoonotic disease that affects both humans and animals. It is caused by the RABV virus of the Lyssavirus genus, transmitted through the bite of infected mammals. Rabies' initial symptoms are non-specific and can mimic the flu. Fever, headache, fatigue, and malaise are some of the symptoms. More specific symptoms, such as anxiety, agitation, and restlessness, emerge as the disease progresses. Ribavirin and Apigenin are two compounds that have been studied for their potential as antiviral agents. Ribavirin formed interaction with the amino acid of the G protein of Rabies in the following positions: Serine C-216, Lysine C-5, Asparagine C-31, and Leucine C-32. This showed that there is a strong hydrogen bonding of serine, lysine, asparagine and leucine with the protein. Apigenin forms interaction with the amino acid of the G protein of Rabies in the following positions: Asparagine C-31, Serine C-216. Chalcone showed 95% yield, Flavone showed 86% of yield, NBS (NBromosuccinimide) showed 76.9% yield and Acyclovir showed 42.30% yield.



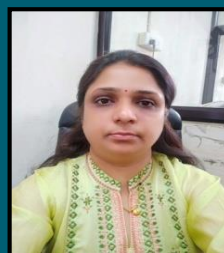
Clinical Pathology

Clinical Pathology

2022-23



Dr. Shashikant Vaidya
Head of the Department
(Till 31st Jan, 2023)



Dr. Sandesha Pashte
Head of the Department
Additional Charge (01/02/2023 - 31/03/2023)

Overview

Department of Clinical Pathology is one of the oldest department in the institute and was established in the year 1905 & undertook studies on communicable diseases like plague, cholera, Malta fever, typhoid, malaria, diphtheria, relapsing fever.

At present Department is actively involved in Training, Research & Testing activities. Department train students for M.Sc. and Ph.D. degree in Microbiology and Applied Biology (Mumbai University), Ph.D. in Medical Microbiology (MUHS) and Short Term Research Training Program. Department is involved in research on Tuberculosis, Hospital infections, Viral neuro pathogenesis, Herbal compounds , Nanotechnology , Diagnostics, Drug development, Matrix metalloproteinases and Homeopathic Nosodes. The department has well established testing laboratory with different sections like bacteriology, mycology, tissue culture, molecular biology and mycobacteriology as per ISO 9001:2008.

Department tests antibacterial, antimycobacterial and antifungal, post fumigation Operation theatre swabs & microwave disinfection systems.

The department comprises of Head of Department, one Scientific Officer, one Senior Technical Assistant, one Laboratory Assistants, one Laboratory Attendant, two doctoral degree (Ph.D.) students and one Master's degree student.

With its tall vision to develop into a centre with complete solutions for diagnosis of infectious diseases, a state of art laboratory, a recognized and accredited laboratory, a surveillance centre for testing of infectious diseases and a modern training centre.

Dr. Shashikant P. Vaidya



Department Photograph



**Clinical Pathology Department Participated and Coordinated for Innovation Festival at
Nehru Science Centre from 1st Feb to 3rd Feb 2023**



NABL Training Programme

1. Identification of ligand receptor interactions across blood brain barrier in viral neuro-pathogenesis.(Extramural Funding)

Team

- Dr. Shashikant Vaidya (P.I.)
- Ms. Durga Bethala (DST-INSPIRE- SRF)

Funding Agency - Department of Science and Technology, Govt. of India

Duration - March 2017- February 2023

Budget - Rs. 24,16,069/-

Abstract

More than 500 million people worldwide are infected each year by any of the four-dengue virus (DENV) serotypes. Dengue serotype 2 (DENV 2) is most predominant in India and other South Asian countries. The clinical spectrum caused during dengue infections is wide and some patients may develop neurological alterations during or after the infection. Clinical evidences suggests that blood brain barrier (BBB) may be compromised during DENV infection; however, it is not clear whether the damage is due to the infection per se or to the inflammatory response activated by the BBB cells. Other neurotropic flaviviruses such as Japanese encephalitis virus (JEV) are also known for neurological damage. JEV uses the bloodstream to enter nerve tissue where it infects cells of the neurovascular unit. Another neurotropic virus like rabies virus (RABV) chooses the retro-grade axonal route to infect the neuronal cells. Both JEV and RABV affect the cells of neurovascular unit in different ways resulting into BBB damage, glial activation and tissue inflammation. Our aim is to study pattern of DENV infection to BBB, compared with other neurotropic viruses like JEV and RABV using in vitro model. In our study, we observed that the BBB is dysregulated by superinfecting DENV2 activated murine macrophage(RAW264.7) on murine endothelial cells (BEnd3) rather upon direct virus infection.

2. Quantitative phosphoproteome profiling of circulating influenza virus strains in Mumbai region. (Intramural)

Team

- Dr. Shashikant Vaidya (P.I.)
- Ms. Pinky Singh (Ph.D. Student)

Funding Agency - Haffkine Institute

Duration - December 2017- March 2023

Budget - 5 lakhs

Abstract

Influenza virus is a major human pathogen whose genotypic diversity results in unpredictable pandemics and epidemics. Although annual influenza epidemics affect around 10% of the global population, current treatment options are limited and development of new antivirals is needed. Elucidation of host factors required during virus infection provides information not only on the signalling pathways involved but also on the identification of novel drug targets. Quantitative phosphoproteomic will help in revealing the unique phosphoproteome dynamics that occur in the host cell within minutes of influenza virus infection. In this study, Influenza virus isolates would be subjected to PCR for amplification of gene sequences as per WHO primer pairing for quantifying relative viral load. Quantitative phosphoproteomic analysis of human lung carcinoma, epithelial cell line (A549) infected with influenza viruses will be performed at varying time intervals.

Harvested cells will be subjected for TEM and flow based studies followed by iTRAQ labelling. Identification and quantitative analysis of iTRAQ-labelled phosphopeptides will be performed using LC-MS/MS.

3. *In-vitro* Wound healing activity of *Curcuma caesia* Rox b extracts.

Team

- Dr. Shashikant Vaidya (PI)
- Ms. Roshni Ravindran Kundanaghatu (Strip M. Sc. Student)

Funding Agency - Haffkine Institute

Duration - November 2022 - March 2023

Budget - Twenty Five Thousand

Abstract

Black turmeric is a perennial herb with a bluish black rhizome that belongs to the Zingiberaceae family. The botanical name is *Curcuma caesia* Rox b. It is used to treat cancer, epilepsy, inflammation, and wound healing. The plant were extracted with different solvents such as ethanol, methanol, distilled water, hexane. The goal of this research is to investigate the phytochemical screening of *Curcuma caesia* Rox b and to analyze the extract by GC-MS to detect unknown compound and to study scratch assay to determine the wound healing activity in the cell line.

4. Invitro assessment of immunomodulatory activity of Anti –Tb drugs on U937 cell line.

Team

- Dr. Shashikant Vaidya (PI)
- Ms. Neha Waghare (Strip M. Sc. Student)

Funding Agency - Haffkine Institute

Duration - November 2022 - February 2023

Budget - Twenty Five Thousand

Abstract

Immunomodulation is modulation of immune system. Drugs taken during the treatment regime may exhibit few immunomodulatory activities. Rifamycin and Rifabutin are one of the few first line drugs prescribed during the active Tuberculosis infection. The administration of these drugs may lead to increase or decrease in expression of immune markers and thus showing immunomodulatory activities. Here, insilico approach was chosen to perform docking studies of these drugs on Aryl Hydrocarbon Receptor and binding score was obtained; Followed by invitro exposure of the drugs to U937 macrophage cell line on different time points to study the gene expression of selected immune markers which in this case are IL6, IL8, IL10, TNF alpha and IFN gamma through qRT –PCR.

5. Host Gene Expression Profiling in U937 cells Infected with Different Strains of Influenza Virus.

Team

- Dr. Shashikant Vaidya (PI)
- Ms. Zalak Mehta (Strip M. Sc. Student)

Funding Agency - Haffkine Institute

Duration - November 2022 - February 2023

Budget - Twenty Five Thousand

Abstract

The Orthomyxoviridae family of influenza viruses often causes intermittent epidemics, but they can also occasionally be fatal to people and trigger pandemics. The influenza A and influenza B virus strains are the primary subjects of this study. For the prevention and control of epidemics, an understanding of pathophysiology, transmission, clinical features, and treatments has become crucial. In the lungs, the influenza virus primarily attacks alveolar epithelial cells and macrophages. The innate immune system becomes active against an influenza virus when it enters a host cell. Both pro-inflammatory and anti-inflammatory cytokines are produced in response to viral infection. These cytokines were investigated along with other hormones like serotonin and metabolites like kynurenine and quinolinic acid. In order to explain how virus infection modifies the host cellular environment in U937 cells, it may be necessary to understand the host responses at various stages of virus infection at the cellular level. This information might then be used to shed light on the biology of virus- host interaction.

6. Host Gene Expression Profiling in A549 cells Infected with Different Strains of Influenza Virus.

Team

- Dr. Shashikant Vaidya (PI)
- Ms. Ketali Pisal (Strip M. Sc. Student)

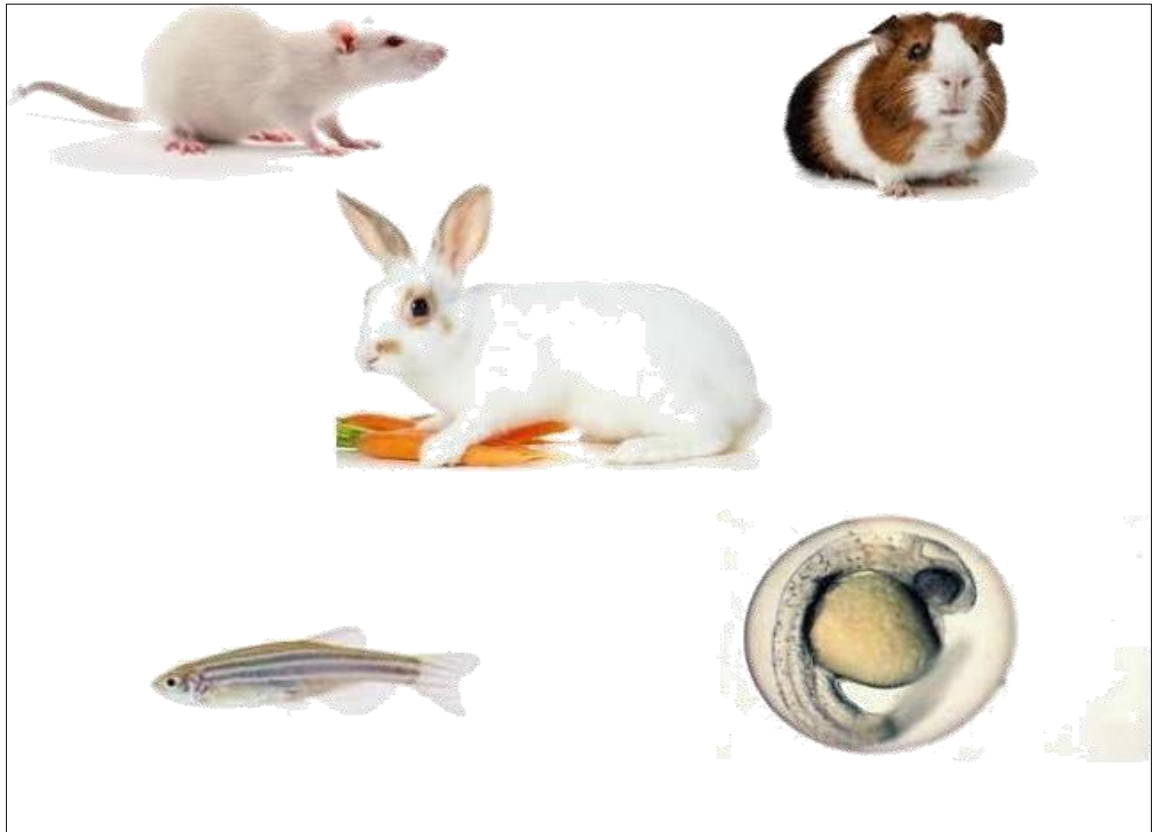
Funding Agency - Haffkine Institute

Duration - November 2022 - February 2023

Budget - Twenty Five Thousand

Abstract

Influenza is a viral respiratory infectious disease that affects millions throughout the world. The influenza virus is a highly polymorphous, negative stranded RNA virus. It is divided into influenza A, B, C and D. Out of these influenza A and B are known to cause pandemics. There have been 10 pandemics of influenza A in the past 300 years. Understanding pathophysiology, transmission, clinical aspects, and treatments have become essential for epidemic prevention and control. In humans, host immunological factors play a significant role in the pathogenesis of influenza viruses. Various defense mechanisms are activated against the influenza virus when it infects a host cell. The infection further activates many genes and pathways to prevent the spread of infection and thereby limiting the disease severity. With the available knowledge, this project focuses on the gene expression in A549 cells infected with various strains of influenza viruses such as Influenza A (H1N1 and H3N2) and Influenza B.



Toxicology

Toxicology

2022-23



Dr. Mrunal Ghag-Sawant
Head of Zoonosis Department

Overview

Toxicology is the study of adverse effects of chemical substances on living organisms and their environment. It is a dynamic multi-disciplinary science that required interactions between biology, chemistry, medicine, veterinary science, pharmacy and environmental biology. Over the past few years, toxicology has played a vital part in drug development. For more than 20 years, the Department of Toxicology and the Institute has been providing services for the comprehensive toxicity testing studies for registration of pharmaceuticals, agrochemicals, biocides, cosmetics, chemicals and related products. Majorly *in vivo* toxicity testing is conducted in the Dept., which is as per the regulatory requirements of the OECD, ICH, FDA, EMEA, OPPTS, BIS and/ or ISO10993.

With the increasing demand for anti-snake venom, the demand for LD50 assays during research and commercial production has increased. Every year, millions of experimental animals are used all over the world to perform LD50 assays of venom. Alternative methods to these assays are urgently needed. The Department of Toxicology is currently involved in the LC50 study of four snake venoms for validation and standardization of assays in small vertebrate animals like zebra fish is in progress.

Future Plan

- To establish NABL accreditation laboratory
- To establish GLP compliance testing and research laboratory
- Up gradation of laboratory facility for *C. elegans* for research purpose.
- Establish in various research studies in zebrafish facility

Dr. Mrunal Ghag-Sawant



Department Photograph

Departmental Activity



Oral Dosing in rat



Intratracheal dosing in rat



Dermal Toxicity study in Rabbits



Retro orbital blood collection



Microscopic observation of zebra fish larvae



Artemia Hatchery

Core facilities

1. Zebra fish facility



Fig 1-Aegis Bio Zebra fish facility



Fig-2 Timer: To maintain 14hrs light and 10hrs Dark Cycle



Fig 3-Control Box: Showing Indicator, Water pump, Air pump, Heater, water pump,



Fig 4 -Control Box: Showing Indicator, Dissolved Oxygen and conductivity



Fig 5- Quarantine Tank



Fig 6- Advance stereo and stereo microscope

Visitors to the Institute – Animal House facility

Sr. No.	Name of Institute/Officer	Co-ordinator Designation	Visited Area	Duration
1	VES College of Pharmacy Mumbai	Mrs. Pradnya Nikhi; Shinde-Korelker Assistant Profecer	Animal House facility	8 September 2022
2	WHO team members	Dr. Swalebha shaikh Dr. Vidya Rout	Animal House facility and Zebra fish facility	18 October' 2022
3	Government Dental College & Hospital	Training department	Animal House Facility	20 January 2023



Animal House facility

1. VES college of Pharmacy
visited to Animal House Facility



Animal House facility

2. WHO team members
Dr. Swalebha shaikh
Dr. Vidya Rout
visited to Animal House Facility



Department of Toxicology participated in Innovation festival 2023 organized by Nehru Sciences Center, Worli scheduled between 1st February 2023 to 3rd February 2023



NABL ACCREDITATION TRAINING – Batch 1



NABL ACCREDITATION TRAINING – Batch 2



Visited Ross Life Sciences Pvt. Ltd. RLSPL For NABL Training

1. Zebra Fish as An Alternative Model for Determining the Median Lethal Concentration of Cobra Venom

Team

- Dr. Mrunal Ghag Sawant (PI)
- Mrs. Swati U. Mumbarkar (Team Members)
- Mrs. Meenal Mulkutkar (Team Members)
- Ms. Ghatkar Madhura Pramod Prerna (M. Sc. Student)

Funding agency - Academic Research/ Department of Toxicology, Haffkine Institute

Duration - 15th January 2023 to 14th January 2026

Budget - 3,08,000/-INR

Status: In process

Abstract

India has the highest number of deaths due to snake bites in the world with 35,000-50,000 people dying per year according to World Health Organization (WHO) direct estimates. In the present study, we will be using only Cobra venom which mainly contains a powerful post-synaptic neurotoxin and cardiotoxin. Animal models are primarily used in biomedical research to understand the cellular and molecular basis of human disease as well as to develop and test novel therapeutic approaches. The 3Rs' major objective is to change current methods of animal testing in order to minimize the use of animals in experimentation whenever possible. This proposal is focused towards validation and standardization of assays in lower sentinel animals like zebrafish. The aim of the study is the standardization and validation of the Median Lethal Concentration and Lethal Concentration of Cobra venom range in Zebrafish. The Median Lethal Concentration using various concentrations of Cobra venom will be assessed in Zebrafish embryos in 24 well plates using 12 embryos in RF assay and 24 embryos in MLC50 per concentration of venom. The Minimum Lethal Concentration of venom will be calculated using statistical analysis. The zebrafish embryos will be observed for clinical symptoms, morbidity and mortality, survival rate, physiological changes and pathological changes. The result are presented as mean $\pm$ SD. Statistical analysis will be evaluated by one-way ANOVA followed by Tukey test. Values with $P < 0.001$ will be considered statistically significant.

2. Determining genotoxic potential of Cobra Venom using *in vivo* method.

Team

- Dr. Mrunal Ghag Sawant (PI)
- Mrs. Swati U. Mumbarkar (Team Members)
- Mrs. Meenal Mulkutkar (Team Members)
- Ms. Shreya Thakur (M. Sc. Student)

Funding agency - Academic Research/ Department of Toxicology, Haffkine Institute

Duration - 15th January 2023 to 14th January 2026

Budget - 4,41,053 INR

Status: In process

Abstract

The Indian Cobra (*Naja naja*) also known as the Spectacled Cobra, Asian Cobra or Binocellate Cobra is a member of the “Big Four” species that are responsible for most of the snakebite cases in India. Phospholipases A2 (PLA2s), Snake Venom Metalloproteinase (SVMP), Snake Venom Serine Proteases (SVSP) and Three-Finger Toxins are the main toxins in venom and are responsible for a variety of pharmacological effects in snakebite patients either singly or in combination. The Indian Cobra’s venom mainly consists of a powerful post-synaptic neurotoxin and cardiotoxin. According to case reports, snake venom is being used as a club drug as an alternative of opioid and alcohol during rave parties. Present work will focus on exploring the effects of snake venom on the genetic material/molecular level using rodents. The aim of the study is to evaluate the Genotoxicity of Sub lethal doses of Cobra venom using *in vivo* method. For Acute Toxicity Assay, Single Dose studies with successive escalations will be carried out to determine the Maximum Tolerated Dose (MTD) in rats. For Micronucleus Assay, animals will be treated with the test substance once and samples of bone marrow and peripheral blood will be taken for slide preparation. Genotoxicity will be confirmed by the presence of micronuclei in observed slides. In Comet Assay, test substance will be administered through subcutaneous route and liver tissue will be used for sample preparation. Slides will be scored per sample and 25 comets per slide using an image analysis software.

3. “Induction of oxidative stress and lethal toxicity and developmental effects of cobra venom on zebra fish embryo”

Team

- Dr. Mrunal Ghag Sawant (PI)
- Mrs. Swati U. Mumbarkar (Team Members)
- Mrs. Meenal Mulkutkar (Team Members)
- Ms. Ankita Chauhan (M. Sc. Strip Student)

Funding agency - Haffkine Institute

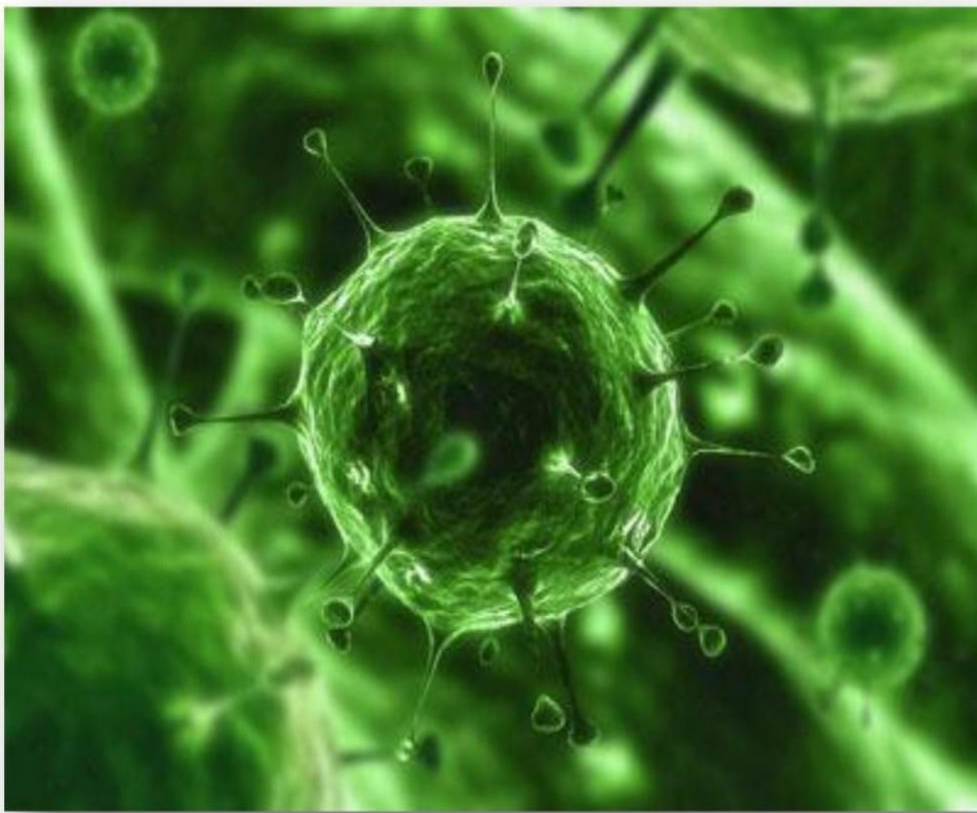
Duration - 1st November 2022 to 28th February 2023

Status: In process

Abstract

Biological derivatives have been mainly associated with production of metabolites which tend to be the by-products of reactions that are formed when induced with oxidative stress. In this study, the effects of cobra venom on zebrafish embryo were studied where they were subjected to multiple concentrations of the venom along with examination of the after-effects on the anatomical development. Using LC50, acute toxicity of cobra venom was determined. Out of the various effects of oxidative, quantification of lipid peroxidation and protein carbonylation in the embryo was performed. MDA (Malondialdehyde) is assayed against TBA (Thiobarbituric acid) at 532 nm. 2,4-dinitrophenylhydrazine (DNPH) derivatization was used for detection and quantification of carbonylated protein respectively.

- Result: Study in progress and results are awaited.



Virology



Dr. Sandeepan Mukherjee

Head of the Department

Overview

Department of Virology is one of the older departments of Haffkine Institute, engaged for the past 95 years in understanding the epidemiology, pathophysiology and host immune response towards various viral diseases. It is a National Influenza Centre recognized by the WHO. Currently, it is a network laboratory under the NCDC-IDSP Influenza-like Illness Surveillance.

Neurovirology, Retrovirology, Vector-borne Virology and Respiratory Virology are the current thrust areas 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 and natural origin are undertaken. The department is also engaged in repurposing of drugs as antiviral agents. These evaluations have both academic as well as commercial outcomes.

The Department organizes an annual Hands-on Training in Techniques in Virology and Immunology. Testing includes diagnosis of viral infections like COVID-19, Influenza and Rabies by classical and molecular virology. 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, BBB proteins); as well as proteins in various infections, is studied. The Department is also plans to set up in-vitro models for evaluating inflammation, immune-modulation and specific toxicity.

A team of four technical and four support staff facilitate the routine tasks of the Department.

Dr. Sandeepan Mukherjee



Department Photograph

1. “Laboratory surveillance of Influenza like Illness and severe acute respiratory illness (ILI-SARI) in India (Extra Mural)

Team:

- Ms Seema Vyas,
- Dr Sandeepan Mukherjee,
- Mr. Pavankumar Todkar

Funding Agency: National Centre for Disease Control, Govt. of India, New Delhi.

Duration: NCDC 2009 Onwards

Budget: 11.20 Lakhs per year

Abstract

Introduction

Influenza viruses are highly contagious, causing acute respiratory illness and afflicting humans since ancient times. World Health Organization (WHO) declared first pandemic of the 21st century caused by Influenza A (H1N1) pdm 09 virus. Department of Virology at Haffkine Institute has been identified as a network laboratory for the national project on surveillance of Influenza like illness under the NCDC-IDSP. Understanding the prevalence and epidemiology of influenza virus infections will not only help in control of the disease as well as aid in the development of effective vaccines.

Under this program, we receive nasopharyngeal/throat swabs from hospitals in and around Mumbai, Thane, and Raigad region. These swabs are subjected for the extraction of viral RNA and the positivity is detected using qRT-PCR.

Objectives

1. To provide epidemiology and seasonality data of influenza virus.
2. To understand the groups at high risk of severe outcomes, including hospitalization and deaths.

Result & Conclusions

From April 2020 till March 2021, we have not received nasopharyngeal/throat swabs, for influenza testing.

2. Surveillance of Mosquitoes in MMR region to assess their potential as vectors of viral infections. (Intra Mural)

Team:

- Dr. Mrunal-Ghag Sawant (Department of Zoonosis),
- Dr. Sandeepan Mukherjee (Department of Virology)

Funding Agency: Haffkine Institute

Duration: Jan 2022 – December 2024

Abstract

Mosquito borne viral diseases have always caused large scale morbidities and significant mortalities in communities. The present study which is being carried out in collaboration with the Department of Zoonosis, Haffkine Institute, shall evaluate the prevalence of such viral vectors in the MMR region.

3. Repurposing of Anti-parasitic agents as Anti-Influenza Drugs (in-vitro assessment)

Team:

- Mr Tushar Rajbhoj (STRIP Student)
- Mr. Pavankumar Todkar
- Dr Sandeepan Mukherjee

Funding Agency: Haffkine Institute

Duration: 6 Month

Budget: Rs.25000/-

Abstract

Influenza is critical concerning factor to human health. It is an acute respiratory viral infection: all the age groups can be infected with influenza. Influenza associated with high mortality during pandemics, epidemics and sporadic outbreaks. Nearly 10% of world's population is affected by influenza annually, with about half a million deaths each year. There are various kind of drugs are already present in market but because of constant mutation in influenza virus genome, we need to discover and repurpose the drugs which can tackle the influenza virus. Here we were repurposing, anti-parasitic agents such as ivermectin and artesunate with the help of in-vitro assessment. Cytotoxicity as well as antiviral potential of drugs IVE and AS were determined. No cytotoxicity was observed when we treated cells with artesunate and there to understand more about anti-viral potential of these drugs further studies need to be carried out.

4. Interplay of Oxidative Stress in in vitro infection of Influenza Virus.

Team:

- Merin Anthony (STRIP Student)
- Sairaj Shinde (STRIP Student)
- Dr Sandeepan Mukherjee

Funding Agency: Haffkine Institute

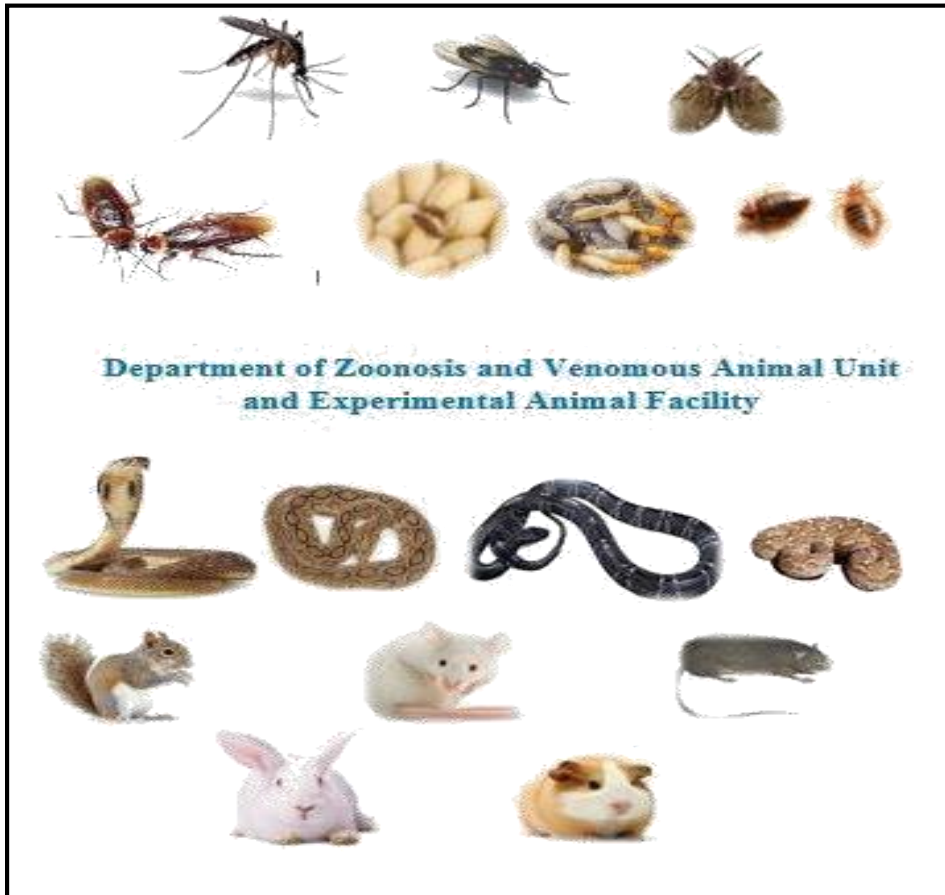
Duration: 6 Month

Budget: Rs.50000/-

(2 Short Term Research Interns worked on different aspects of the project)

Abstract

Influenza virus infection is the major cause for the morbidity throughout the world. Many people from different parts of the world are suffers from influenza virus infection. The most important characteristics of influenza virus is, it replicates within the nucleus of the host cell. Simultaneously affected on the different signalling pathways, and redox parameters of cell. There are different types of treatments are available for the influenza infection like antiviral drugs, vaccines, etc. But there is no any permanent solution available for the cure. There is rapid mutation occurred in the different strains of influenza virus. The most significant pathway is cytokine signalling pathway which helps to study the inflammatory responses in the cell. The production of excessive cytokines leads to induce the oxidative stress due to the production of reactive oxygen species. To understand the different oxidative stress parameters like nitric oxide, thiobarbituric acid reactive species, glutathione, superoxide anion and gene expression study for the two genes TNF- α , IFN- γ we have used human lung carcinoma cell line (A549). The cell line is infected with the three different strains of influenza viruses like pH1N1, H3N2, and Influenza B at two different time points. The superoxide anion assay was performed using NBT. The estimation of NO was done by using griess reagent, The determination of pro-oxidants like glutathione was done by using GSH assay. The estimation of TBARS was done by using the TBARS assay. The differential gene expression of immune mediators like TNF- α , and IFN- γ were done by using RT-PCR. The fold changes of these genes were compared to understand the host responses to the influenza infection. The data obtained from the present study helps to design the antioxidant molecule over the production of pro-oxidants when oxidative stress conditions occur due to the influenza infection and the development of therapeutics that target the genes in maintain a balance of the cytokine storm.



Zoonosis and Venomous Animal Unit and Experimental Animal Facility

Zoonosis and Venomous Animal Unit and Experimental Animal Facility 2022-23



Dr. Mrunal Ghag-Sawant
Head of the Department

Zoonosis

Overview

Department of Zoonosis have three different units functional under the same umbrella namely Entomology unit, Venomous animal unit and Experimental animal facility. Department is committed for training, research and testing in the field of Vector and vector borne diseases, snake and snake venom and animal disease models.

History

The present Zoonosis department was started in the year 1938 as Department of Entomology under the leadership of Dr. M. Sharif, D.Sc. Ph.D. to work mainly of entomology with plague and its transmission. Dr. P. J. Deoras, Assistant Director has succeeded after that and continued to work on plague and established venomous animal unit along with insect colonies of Public Health Importance. The history of venom/ anti-venom research and procedure for venom extraction from live venomous snakes started way back before 1920. Experimental animal facility is CPCSEA approved state of art animal facility for small laboratory rodents and functioning as centralized facility of Haffkine institute wherein various research, training and testing activities are performed.

Present state of affair

Currently department is actively engaged in Training, research and testing and besides the earlier activities new training and testing methodologies are regularly introduced with full zeal & devotion.

In research, the entomology unit is contributing to existing knowledge in Public health and Infectious zoonotic diseases with special reference to Malaria. The various projects in the department are aimed to understand- vector behavior, Vector Control, Contribution of the genetic mutations towards insecticide resistance, Diagnosis of the disease, investigating the role of trace metals in disease pathophysiology, by doing in vitro cultivation of malaria parasite, screening of various antimalarial natural compounds is carried out. , development of new and improving existing vaccines.

The venomous animal unit has license from state forest department to maintain various kinds of a venomous, non-venomous snakes and scorpions. The major research activity of venomous animal unit is on snake venoms to explore their therapeutic potential such as anti-cancer, anti-inflammatory potential. This unit is involved in screening of natural compounds to explore their repellent property against snakes in laboratory, is also engaged in research on anti-snake venom and anti-scorpion toxin which will facilitate in reduction of snake bite and scorpion bite fatality incidences and venomics of snake venom proteins. One of the major roles of the department is to provide good scientific grade lyophilized venom for anti-venom producing and other research institutes.

Experimental animal facility is involved in various core areas of animal research includes standardization and validation of various animal disease models of infectious and metabolic disease, zoonotic disease such as Rabies, Japanese encephalitis, Anti-Inflammatory, Osteoarthritis, Anti-diabetes, wound healing etc.

In training, the department conducts various training programs on “Snakes and their Importance” for those who are working with public health authorities, paramedical, veterinary and medical institutes, colleges and schools, at state and national levels. “Mission to control mosquito menace” aimed at training and teaching the college students and other interested professionals to create public health awareness in the control of Mosquito and mosquito borne diseases. Animal facility conducts workshop on “Principle and practices of laboratory animal care” which encompass concepts of in vivo experiments and its applications in the field of research as well as ethical issues, welfare regulations

In testing, the Department is a Central Insecticide Board, Ghaziabad, New Delhi approved center and is actively engaged in testing of household insecticides as per WHO guidelines, this department also provides testing facilities for identification of venom samples especially those seized by police and forest departments of India. Experimental animal facility conducts various academic animal testing activities such as the Anti-Inflammatory, Hepatotoxicity, Hyperlipidemia, Malaria, Filarial, Osteoarthritis, Atherosclerosis and Fistula in Ano etc. Apart from this department also provides rented facility for organization/ institution for their research/ breeding purpose with prior permission of Institutional IAEC committee.

Insect breeding laboratory and insecticide testing facility

The present insect breeding laboratory was established in year 1938. This laboratory has state of art breeding and rearing of laboratory insects colonies of Public Health Importance.

Current insect breeding laboratory have live phase of clinically important mosquito species such as *Aedes aegypti*, *Culex quinquefasciatus*; fly species such as *Musca domestica* among flying insects. This laboratory is also breeding and rearing crawling insects, such as *Periplaneta Americana*, *Blattella germanica* and *Blatta orientalis*.

Insect rearing is performed by trained personnel with at most biosafety, occupational safety and ethical precaution.

The insectary rooms are maintained at 28°C and ~80% humidity, with a 12 hr. day and night cycle. Mosquitoes are bred in metal cages and fed with blood by using laboratory animal in order to get continues colony for testing and research purpose. All trays and buckets consisting adult insect, larvae and pupae are covered with non-chemical treated netting. If any insect escape during handling, they either be collected by using catching device or killed by using commercially available electric racket.

Research activities Insectary provides laboratory bred sterile insects for various Bio efficacy, persistency, repellence, testing against crawling & flying insects, mosquito repellence test on human skin, as per WHO guidelines

Future Plan

- To establish well equipped Insect breeding laboratory.
- To establish GLP/NABL compliance testing and research laboratory.
- Up gradation of laboratory facility for housing and testing of squirrel, bird and termite.

Dr. Mrunal Ghag Sawant



Department Photograph

Venomous Animal Unit

Overview

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

In 1920 Venomous Animal Unit is India's premier unit working on snake and was established to prepare anti-venom sera against venomous snakes and scorpions and also to study- Repellency of snakes against various herbal and chemical components, Behavioral changes in serpentines, Anti-snake and anti-scorpion venoms.

The history of venom/ anti-venom research and procedure for venom extraction from live venomous snakes originated way back before 1920 by honorable Dr. Dalal. This facility has license from state forest department to maintain various kinds of a venomous, non-venomous snakes and scorpions in captivity for 90 days.



Photo Courtesy: Digital Library of University of South Carolina

The old snake housing facility was constructed way back in year 1960. However as per the current international norms serpentarium is upgraded to house more than 100 snakes. This advance facility

have environmental parameter control systems. Snakes are hunted from permitted forest divisions and brought to serpentarium. Then snakes undergo period of quarantine, during which complete health checkup is performed. Snakes are then introduced in stock for venom milking purpose. Snakes are fed with healthy laboratory bred mice or rat. Snake venom is extracted from different types of venomous snakes manually using head catch method with minimal stress to snakes. Extraction is performed by trained personnel at regular intervals under the supervision of veterinarian and medical doctors with at most biosafety, animal safety, occupational safety and ethical precaution. This extracted venom is stored in the form of lyophilized powder until its requirement for production of anti-snake venom and for various aspects of research and education. Snakes are handed over to forest department after the holding period of 90 days to release back in natural environment.

Future Plan

- To establish western zone venom referral center
- To establish NABL compliance testing and research laboratory

Dr. Mrunal Ghag Sawant



Department Photograph

Experimental Animal Facility

Overview

The Experimental animal facility is available to boost the teaching, training and research facilities and to meet the growing demand for high quality laboratory animals in emergent field of Laboratory animal science. Qualified veterinarians and technical personnel are always at hand to help carry out research and keep it in accordance with the standards established by the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA).

Animal care the laboratory houses rats, mice and rabbits. Each species of animals is maintained in individual rooms to avoid disease transmission and inter-species conflicts. All efforts are made to maintain the animals under controlled environmental conditions [Temperature (22-26°C), Relative Humidity (60 ± 10 %), 12 hrs alternate light and dark cycle] with 100 % fresh air exchange in animal rooms and uninterrupted power and water supply. The support staffs ensures that every part of animal care including feeding, watering, restraining, cage cleaning, record keeping and ordering of animals, feeds, bedding materials and equipment from outside sources are monitored. The animals themselves are isolated from human habitation and guarded from dust, smoke, noise, wild rodents, insects and birds-in fact anything that would disturb their habitat. A high degree of hygienic conditions (macro- and micro- environment) around the animals are maintained as per the CPCSEA guidelines.

Animal ethics The Animal House is registered with the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Ministry of Environment and Forests, Govt. of India (Reg. No) and has an established Institutional Animal Ethics Committee (IAEC) that advises the students, teachers/researchers on facilities, policies and practices concerning the care and use of animals.

Veterinary care Periodic health monitoring of the animals is carried out to ascertain the health status of the animals. Veterinary care is crucial to keep the animals content and healthy. The veterinarian keeps them under daily observation and monitors any behavioural changes or signs of illness. The veterinarian supervises their diet and sanitation and contributes to the formulation of appropriate policies and procedures for ancillary aspects of veterinary care.

Various core areas of animal research includes standardization and validation of various animal disease models of infectious and metabolic disease, zoonotic disease such as Rabies, Japanese encephalitis, Anti-Inflammatory, Osteoarthritis, Anti-diabetes, wound healing etc.

Dr. Mrunal Ghag Sawant
Incharge, Experimental Animal Facility



Department Photograph

Departmental Activity

Bio-Safety Cabinet (BSC-2)



Cooling Centrifuge



Dissection Microscope



Fluorescence Microscope



Inverted Microscope



Lyophilization Machine



Core facilities

1. Insect breeding laboratory and insecticide testing facility



Mosquito rearing facility



Mosquito rearing facility



Adult Mosquito collection for Testing



Peet – Grady Chamber for Insecticide testing

2. Serpentarium (Venomous animal unit)



Complete view of snake housing



Provision of hideouts for snakes



Snake Venom extraction



Safety provision for handling venom in laboratory

3. Experimental Animal Facility



Experimental Animal Facility



Autoclaving Room

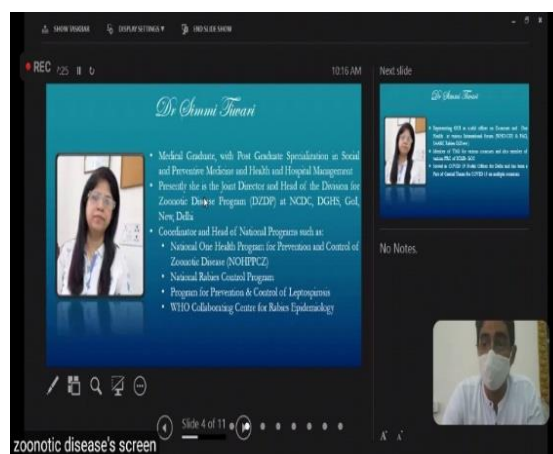


Individual Ventilated Caging System



Clean Corridor

World Zoonosis Day – 2022



On 15th July 2022, Department of Zoonosis celebrated online **World Zoonosis Day** organized by Zoonosis department, in coordination with department of Virology and Training. Zoonosis Department conducted World Zoonosis Day as a resource faculty under Haffkine Institute NCDC-NOHPPCZ.

Sr.No.	Name of Workshop	Date	No.of Participant	Funded by
1	World Zoonosis Day	15/07/2022	76	NCDC, New Delhi

Visitors to the Department

Sr.No.	Name of Institute	Co-ordinator	Visited Area	Duration
1	VES College of Pharmacy,Mumbai	Mrs.Pradnya Nikhi,Shinde-Korelker Assistant Professor	Animal House Facility	8 September 2022
2	WHO team members	Dr.Swalebha Shaikh Dr.Vidya Raut	Animal House Facility	18 October 2022
3	Government Dental College & Hospital	Training Department	Animal House Facility	20 January 2023
4	Director General of Health Science, New Delhi (DGHS)	NCDS Haffkine Team	Animal House Facility	10 th March 2023



Director General of Health Science, New Delhi (DGHS) visited Animal House Facility



Four days Training Programme on “General Requirements for the Competence of Testing & Calibration Laboratories and Internal Audit as per ISO/IEC 17025:2017”.



Innovation Festival in Nehru Science Centre, Worli, Mumbai



Attended and presented Institute Activities Group Meeting All India Network Project on Vertebrate Pest Management, ICAR Jodhpur.



One day interactive Training on “Operational Methodology of ISO 17025: 2017 Accredited Laboratory “ at Ross Life Sciences, Pune on 06th October 2022

Research Projects 2022-23

1. *In vitro* and *In vivo* Activity of Phospholipase A₂ enzyme against *Plasmodium* sp.

Team

- Dr. Mrunal Ghag Sawant (PI)
- Mrs. Trupti Satvekar (CO-PI)
- Ms. Sheetal S. Shetty (M.Sc. Student)

Funding Agency: Haffkine Institute (M.Sc. Project)

Duration: 22/03/2021-21/03/2024

Budget: 300000/-

Abstract

Malaria is a parasitic disease with vector transmission involving a diversity of parasites in different ecological environments. In 2018, the World Health Organization (WHO) reported 228 million cases of malaria, with an estimated 405,000 deaths; children under the age of 5 represent the most vulnerable group for this endemic disease. Available drugs for the treatment of malaria are also expensive, have side effects and/or there may be some drug resistance, which has encouraged the development of new drugs. Phospholipase A₂ is an enzyme that catalyses the hydrolysis in the sn-2 position of phospholipids, triggering the release of fatty acids and lysophospholipids. PLA₂s various sources have reported antitumor potential, antiviral and antiparasitic activity which makes this group of proteins promising targets of study. The aim of the study is to evaluate the *in vitro* and *in vivo* activity of Phospholipase A₂ enzyme against *Plasmodium* sp. The cytotoxic activity of the enzyme in different concentrations will be tested on Peripheral Blood Mononuclear Cells (PBMC). The 50% cytotoxic dose will be calculated by linear regression.

Indirect hemolysis will be evaluated following the method that uses agarose gel-erythrocytes-egg yolk along with red blood cells in suspension. The Minimum Indirect Hemolytic Dose (MIHD) will be calculated. The *in vitro* assays will be done in a 96-well microplate with RPMI 1640 medium with *P. falciparum* cultures. The activity will be tested by SYBR Green I test and the fluorescence will be measured using spectrophotometer with an excitation of 485nm and an emission of 590nm. Enzyme concentrations showing efficacy above 60% will be assessed for their toxicity in Swiss Albino mice. The mice will be observed for any behavioral changes as per the Standard Toxicity Study Guideline, OECD. The *in vivo* antimalarial assays will be done by a four-day suppression test, followed by *in vivo* antimalarial activity. The results will be presented as mean + S.E.M. of three replicates and experimental differences between means will be determined by analysis of variance followed by Dunnett's test for intragroup comparisons. Significance will be set up at $p < 0.05$.

2. Mapping mosquito vectors and monitoring insecticide resistance in and around Mumbai Metropolitan Region.

Team

- Dr. Mrunal Ghag Sawant (PI)
- Mr. Pradeep Jadhav (M.Sc. Student)

Funding Agency: Haffkine Institute (M.Sc. Project)

Duration: 03/01/2022 to 02/01/2025

Budget: 300000/-

Abstract

Insecticide resistance is defined as heritable change in the sensitivity of a mosquito population to an insecticide, which is reflected in repeated field failure of that product to achieve the expected level of control when used according to label recommendations for that pest species.

Insecticide resistance in mosquito vectors is a growing concern and requires immediate attention because of the limited chemical arsenal available for vector control. Although insecticide resistance has been identified in some surveys, very negligible data is available about the current extent and distribution of this resistance in many parts of Mumbai metropolitan region and surrounded area, hence there is a need to perform more comprehensive studies to understand its extent, which will ensure the most appropriate insecticides to be used for effective vector control. Such information is essential for the planning of effective vector control interventions.

In the last decade, the emergence of resistance in populations of *mosquitoes* to common class of insecticides used in public health was reported from many parts of India. Malaria research program use pyrethroid impregnated long lasting insecticide nets (LLINS) and indoor residual spraying (ISR) which uses different insecticides, all from the pyrethroid class. These same insecticide classes are also widely used to control agricultural pests and this can pose additional selection pressure on mosquitoes, resulted in the evolution of insecticide resistance.

This study is designed to assess the insecticide resistance status of different species of mosquito vectors in and around Mumbai city.

The study sites will be selected after extensive survey of mosquito breeding sites. Bioassay will be performed on adults collected from the field to assess the susceptibility of insecticides as described by the standard WHO testing protocol. Data from insecticide susceptibility tests will be used to characterize the susceptibility levels of mosquito populations in the study sites. Molecular characterization will be done using Polymerase chain reaction (PCR) and biochemical assays (Acetyl cholinesterase assay, Esterase assay, and Monooxygenase assay) to detect resistance level and mechanism involved.

3. Monitoring and detection of mosquito borne viruses and their identification in and around Mumbai.

Team

- Dr. Mrunal Ghag Sawant (PI)
- Mr. Pradeep Jadhav (Co-PI)
- Ms. Mayurakshi Thakur (Strip Student)

Funding Agency: Haffkine Institute (Strip Project)

Duration: 01/01/2022 to 01/06/2022

Budget: 25000/-

Abstract

Mosquito surveillance is conducted as routine analysis towards the concern of public health. Any mosquito control programme will be effective if proper and regular surveillance of both larval and adult mosquito populations has been conducted over a period of time. The aim is to monitor the changes in the mosquito population, identify the species and perform quantitative analysis for the dengue virus, considering the recent outbreak was of dengue. Mosquito-borne infections continue to be a major source of morbidity and mortality in tropical areas. Despite improvements in malaria management, malaria-related morbidity remains high, while arboviruses- most notably dengue fever are responsible for an increasing burden of disease, even in middle-income nations where malaria has been nearly eradicated. Dengue virus is an important arboviral infection that causes infectious disease. When it comes to dengue fever, prevention is always the best cause due to severity of the condition. Effective vector control methods are essential for dengue prevention and management. To estimate the prevalence of viral pathogen i.e. dengue virus in mosquitoes, Quantitative Reverse

Transcriptase Polymerase Chain Reaction (qRT-PCR) is used to examine small amount of viral RNA obtained from mosquitoes. This use of RT-PCR as regular laboratory procedure offers a quick alternative for detecting viral RNA in samples collected in field. To check for presence of the dengue virus, first collection and identification of adult mosquitoes, pooling, RNA extraction and qRT- PCR to be performed.

4. Monitoring of insecticide resistance and genetic diversity in mosquito disease vector.

Team

- Dr. Mrunal Ghag Sawant (PI)
- Mr. Pradeep Jadhav (Co-PI)
- Ms. Bhagyeshri Gaikwad (Strip Student)

Funding Agency: Haffkine Institute (Strip Project)

Duration: 01/01/2022 to 01/06/2022

Budget: 25000/-

Abstract

Vector-borne disease control relies on effective vector surveillance. Insecticide resistance is an essential part of entomological surveillance. Mosquitoes of the *Aedes* genus are the primary vector of worldwide disease viruses including Dengue DEN, CHIKV, Rift valley fever, Yellow fever virus and ZIK virus vectors, with a billion of people living in endemic countries. The absence of anti-viral drugs relevant to mosquito disease vectors ultimately leads to the use of chemical insecticides which are the most effective in mosquito vector control. Taking this into consideration, the rapid emergence of insecticide resistance in mosquitoes could give major challenges for arboviral-borne disease control.

In this research study, the insecticide resistance and susceptibility level mechanisms will be monitored from various places/wards of Mumbai city. As the generations and seasons change, genetic variation in mosquito vector also takes place. Due to this, regular assessments of insecticide resistance

should be monitored and performed on exposed population to optimize local integrated mosquito management strategies. Therefore, the utilization of effective and safe for human's insecticides

against adults as well as the larval population of mosquito vectors is the most efficient method to rapidly reduce the transmission of various mosquito vector viruses. Here, we will use pyrethroids based insecticides in which the determination of survivability and resistance activity for both adult and cultured larvae mosquitoes will be tested using guidelines of the Centre for Disease Control and Prevention (CDC) by utilizing Bottle Bioassay method. This bioassay checks the resistance mechanism or maximum mortality rate of mosquitoes just by comparing exposure and diagnostic time duration with the actual time.

This study also investigates that the various mutations occurred in the Voltage-gated Sodium Channel (VGSC) conferring pyrethroid resistance against mosquito vectors. We will also study molecular genotyping sequencing of those occurred mutations that will be performed by DNA extraction followed by using Polymerase Chain Reaction (PCR) assay and sequencing method. Identification and determination of insecticide resistance should be routinely and regularly performed for the developing effective mosquito control programs in Mumbai.

5. Tracking Insecticide Resistance in mosquito vector of human diseases

Team

- Dr. Mrunal Ghag Sawant (PI)
- Mr. Pradeep Jadhav (Co-PI)
- Mr. Shubham Sakpal (Strip Student)

Funding Agency: Haffkine Institute (Strip Project)

Duration: 01/12/2022 to 29/02/2023

Budget: 25000/-

Abstract

Mosquito-borne diseases, the most well-known of which is malaria, are among the leading causes of human deaths worldwide. Vector control is a very important part of the global strategy for management of mosquito associated diseases, and insecticide application is the most important component in this effort. However, mosquito-borne diseases are now resurgent, largely because of the insecticide resistance that has developed in mosquito vectors and the drug resistance of pathogens. A large number of studies have shown that multiple, complex resistance mechanisms in particular, increased metabolic detoxification of insecticides and decreased sensitivity of the target proteins or genes are likely responsible for insecticide resistance.

Therefore, this study was aimed to identify and evaluate the efficacy of the phenotypic and genotypic assessment of insecticide resistance of commonly used insecticides for the vector control by the Municipal Corporation of Mumbai and neighboring cities. In this study susceptibility and resistance among various mosquito's population was monitored by utilizing CDC bottle bioassay followed by Biochemical and Molecular assays. As the generation and seasons changes, the genetic makeup of mosquito gene may get mutated and development of certain gene variations occurs in the vectors of Mosquitoes. This vector control management strategy should be routinely monitored and performed on exposed populations to optimize local integrated mosquito management strategies.

Supporting Departments

Dispensary

2022-23



Dr. Shashikant Vaidya

Head of the Department
(Till 31/01/2023)



Dr. Sandesha Pashte

Additional charge as Head of the Department
(From 01/02/2023 - 31/03/2023)

Overview

VISION, MISSION, GOAL

- To provide comprehensive primary Health care for acute chronic illness.
- Emphasis on Preventive Health care by providing Pre-exposure prophylaxis vaccination and regular health check-ups.
- To educate the patient about future complications of their illness by counselling and creating awareness.

Dispensary was established to provide medical facility for Haffkine Institute employees. Medical Officers provide treatment for various diseases and immunization for Haffkine students, staff and their relatives in dispensary. Medical reimbursement bills were accessed in dispensary.

Haffkine Institute Dispensary provides Pre exposure prophylaxis vaccination facility to its employees and students for Hepatitis-B, Rabies, Tetanus, and Influenza.

Medical officers of Dispensary provide Outpatient Department facility and monthly medication for chronic illness [like hypertension, Diabetes, dislipidemia, anemia, raised BMI, hypothyroidism, chronic joint pain etc] and acute illness [Like U.R.T.I., UTI, Gastroenteritis, gastritis, hypotension, fever, injuries etc], for staff & their family members and students.

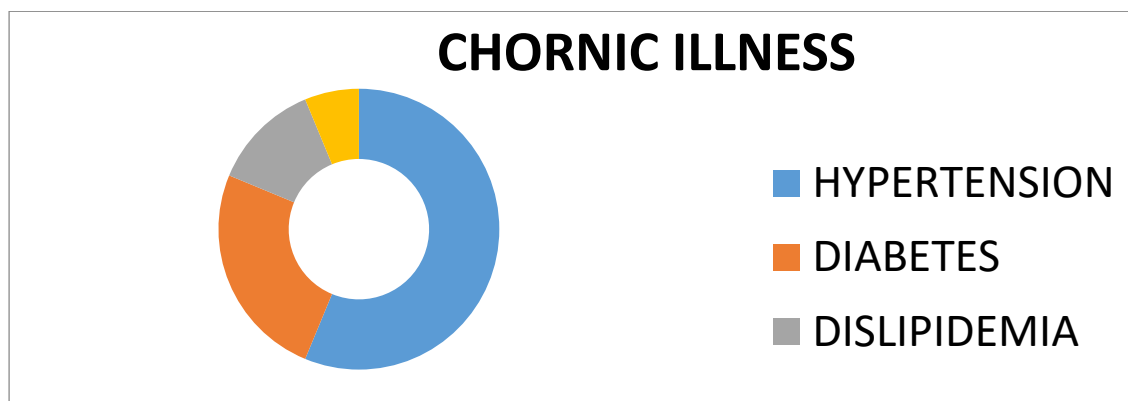


Fig-Patient taking treatment for chronic illness at Dispensary, HITRT.

Dispensary conducts Medical Checkup for Institutes Staff and students. During medical checkup medical officers provide health assessment by evaluating Chief complaints, Vaccination history, Personal habits, BMI, waist-hip ratio, Vision check- up (Near & Distant), Pulse, and B.P. Systemic Examination. Treatment, diet counseling and life style changes are advised as per requirement. Routine follow-up for chronic illness patients is done in dispensary.

Dispensary unit had conducted Annual Medical Check-up for CTU Employees in April 2022.

Dispensary unit had conducted Annual Medical Check-up for Animal House Employees in June 2022.

Dispensary provides first aid facility to all departments. Antenatal care is provided to pregnant employees. Pre-employment check-up is also done at dispensary by medical officers. OPD treatment and consultation facility is provided by Medical officers for HBPCL employees whenever required.

Medical officers provide consultation and treatment to PWD staffs and their contract workers and CNCS staff. Medical Officers provide clinical assistance for various research projects.

Dispensary provides medical Assistance to V.A.U. department during snake/ scorpion venom milking procedure. Medical Officers provide Training on topic “Snake bite and first aid” during Annual workshop conducted by V.A.U.

Dispensary unit had conducted Pre Employment Medical Check-up for Apprentice Students in 2023.



Dispensary Unit Staff Photograph



Dispensary Staff Attended the NABL Training



Dispensary Unit Staff has done Poster Presentation on Azadi Ka Amrit Mahotsave in Aug 2022



Participated in Innovation Festival at Nehru Science Centre from 1st Feb to 3rd Feb 2023

- Dispensary Unit Staff has attended Lecture series on Human Rabies management on 28th September 2022 on occasion of World Rabies Day Celebration.
- Dispensary Unit staff has Celebrated Marathi Bhasha Din in Feb 2023.
- Dispensary Unit Staff has attended Webinar on Sensitization meeting on prevention and control of zoonotic diseases (NOHPPCZ) on 14.03.2023.

Library

2022-23



Mrs. Sarita Ajit Wadekar

Librarian

Overview

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. Research in Biomedical and allied sciences with a special reference to the communicable diseases.

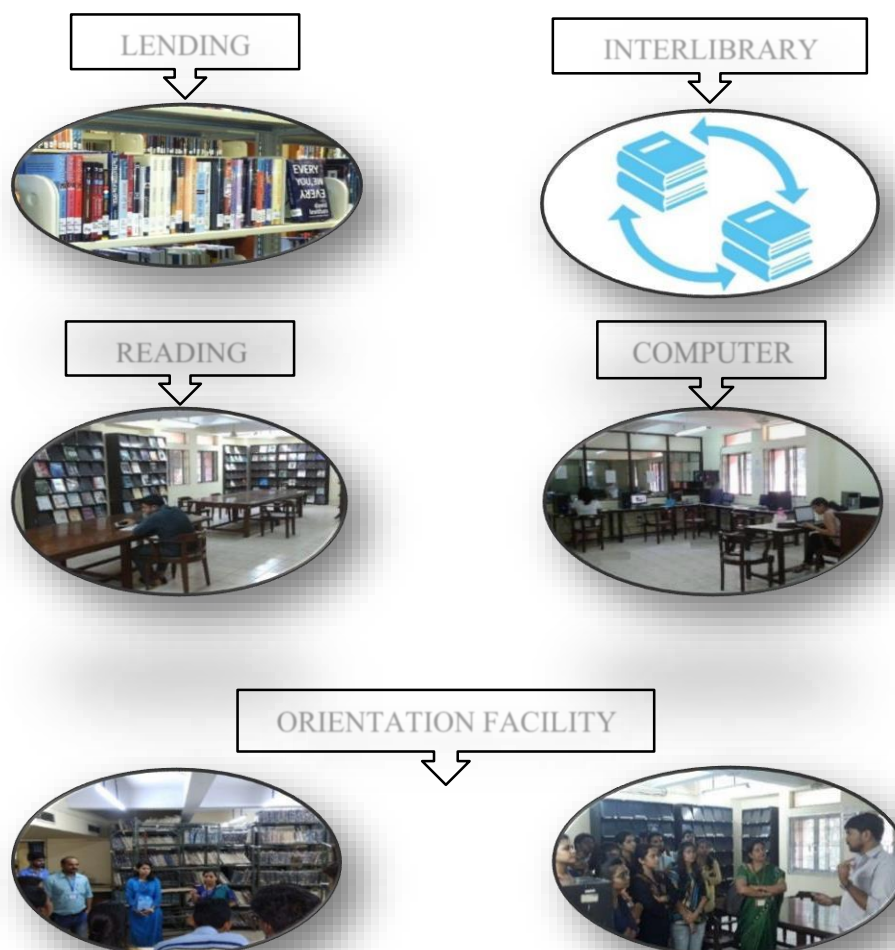
This year library continued to provide online scientific search and retrieval facilities to the staff, researchers and students. Users mainly consisted of Scientific Staff, Research Fellows and the students enrolled for the various programmes of the institute. The library also provided reference service 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 on the basis of Inter Library Cooperation. Similarly, publication 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 library usage and how to conduct the literature search effectively.

Library Collection

DESCRIPTION	TOTAL
Books	10923
Bound Volumes of Journals	27603
Theses	511

LIBRARY FACILITY



THE LIBRARY COMMITTEE

The Library Committee Members meet regularly to discuss the matters associated with the library.

Sr. No	Name of Committee Member	Designation
1	Dr. Sandeepan Mukherjee	Chairman
2	Dr. Ashish Asrondkar	Member
3	Ms. Swati Mumbarkar	Member
5	Account Officer (Haffkine Institute)	Member
6	Ms. Sarita Wadekar	Member Secretary



Department Photograph

BOOK EXHIBITION

The Haffkine Institute Library organized a Book Exhibition to commemorate the “**Marathi Bhasha Samvardhan Pandharwada 2023 from 16th January to 20th January 2023**”.



Radiation Biology Unit

2022-23



Dr. Anuya Rege
Senior Scientific Officer



Mr. Manoj K. Patil
Scientific Officer & Radiological Safety Officer

Overview

This facility was sponsored by Department of Science & Technology (DST). The main aim and objective of the Radiation Biology Unit is to provide a safe and secure laboratory for handling and storage of radio-isotopes and to conduct experiments related to radio-isotopes/radio-labelling, as per the guidelines established by the Atomic Energy Regulatory Board (AERB), Gov. of India.

Furthermore, the Radiation Biology Unit is approved as Type II laboratory for handling low energy Beta (β) emitting sources such as Tritium (H^3), Carbon (C^{14}), Phosphorous (P^{31}) and Sulphur (S^{35}). The facility can be useful for work related to radioactive organic and bio-organic molecules, radio-labelled plant extracts etc., which can be achieved by collaborating with the Board of Radiation and Isotope Technology (BRIT), to make radio-labeled compounds.

Instruments available in the Facility:

- 1) Liquid Scintillation Counter.
- 2) Phosphor Imager.
- 3) Centrifuge.
- 4) Fume Hood.
- 5) Radiation Survey Meter.
- 6) Cryostat Microtome.



Liquid Scintillation Counter



Phosphor Imager



Fume Hood

Training Department

2022-23



Dr. Vrushali Patil

In-charge, Department of Training

Overview

The Haffkine Institute is working in the country's premier biological and public health related research, training and testing institute. The Institute is working in the broad areas of Social Health Services / Basic Research in Life Sciences / Infectious Diseases / General Diseases / Medicines and Drugs, Snake Venoms and Insecticides etc. Haffkine Institute is working as Regional Coordinator for Zoonotic Diseases for the State of Maharashtra under NCDC- National One Health Programme. The Institute serves as a for most leading teaching institution in the field of biomedical sciences.

Haffkine Institute has been affiliated and recognized by the University of Mumbai for M.Sc. (By Research) and Ph.D. Degree courses in Applied Biology, Microbiology, Chemistry and Biochemistry. It has also been affiliated to Maharashtra University of Health Sciences (MUHS), Nashik for Ph.D. degree course in Applied Medical Biology.

Haffkine Institute also offers a research platform through Short Term Research Internship Programme (STRIP) to the students who are pursuing the master's degrees under the recognized universities. Training department is also actively engaged in coordination of various training programme indifferent batches.

- **Post-doctoral fellowship programme:-**Training Department initiated for the MoU Post-doctoral fellowship programme in collaboration with Maharashtra University of Health Sciences (MUHS), Nashik.
- **SIP:-**Maharashtra University of Health Sciences, Nashik approved Haffkine Institute as SIP Centre for the Summer Internship Program (SIP) for all Medical students.

- **NATS:** - This year Training department starts National Apprenticeship Training Programme (NATS) programme in Haffkine Institute. NATS is established by the Board of Apprenticeship Training / Practical Training of the Ministry of Human Resource Development (HRD, GoI), Government of India.

Under this scheme, students are trained in the best institutes in central, state and private sector. The letter no. As per BOAT/IMP-IX/ NOTICE/ WMHMCS000086/ 2022 dated 08.09.2022, a total of 11 trainees have been allowed to Haffkine Institute for General Stream Graduates under the National Apprenticeship Training Scheme (NATS).

At present 5 students have joined under NATS scheme in different departments of Haffkine Institute.

- **BITP:-** Training department take initiative for starts DBT-Biotech Industrial Training program (BITP) in Haffkine Institute. The Department of Bio Technology (DBT) has approved Haffkine Institute as a training center on dated 3/4/2023 under the Biotech Industrial Training program (BITP). The said scheme is also B.E /B.Tech. / M.Sc. / M.Tech. / M.V.Sc. / Scheme of practical industrial training for MBA Biotechnology and Bioinformatics students. Haffkine Institute has been approved to start a batch with an initial intake capacity of 10 students for 6 months.

Training Activity

1. Analytical Training for Instrumentation

Analytical Training for Instrumentation (ATI) is conducted by Department of Chemotherapy. This course aims to equip participants with the analytical and interpretative skills critical for working in the laboratory. These skills will be acquired through experimental methods with particular emphasis on safety, essential calibration and fundamental method validation, chromatography and spectroscopy instrumentation as well as data handling, analysis and reporting. The skills and knowledge learnt will reinforce chemistry theories and their applications in the workplace. Upon successful completion of this course, participants will be able to carry out essential analytical work in the laboratory independently.

2. Hands on Training in Techniques in Virology and Immunology

Department of Virology conducts the course entitled 'Hands on Training in Techniques in Virology' (HoTT Virology) annually. This course is open for undergraduate and post graduate students in various fields of biological sciences. It aims to impart hands-on skills to these students required for research in Virology. This program is conducted during mid-May to mid-July every year. The program is conducted in different batches, each batch running for five days. It covers lectures on topics such as Biosafety, Life cycle of DNA/RNA/Retroviruses, Differential diagnosis of viral infections to name a few. It also includes hands-on sessions on Haemagglutination/inhibition, Chick embryo inoculation, ELISA, PCR, Animal tissue culture etc.

3. Introduction to Covert Existence of Snakes

Introduction to Covert Existence of Snakes (ICES), a one of a kind of Snake Workshop designed to upgrade the knowledge on Biology & conservation of snakes, snake bite, anti-snake venom and post bite measures and to create awareness about snakes. A pioneering initiative by the Haffkine institute is aimed at all those people who have taken the efforts to understand and learn about their co-existing reptiles. Be it snake rescuers, students, enthusiasts who would like to improve their knowledge or others who want to learn right and ethical methods of handling them, dealing with accidental bites so this comprehensive snake workshop is an open door to learning about reptiles. This workshop encompasses awareness about Snakes, Snake conservation and Rescue techniques, Snake bite and Anti-snake venom Production, Importance of venom in Biomedical Research and Maintenance of Snake in Captive. This workshop is of two days duration for a batch of 10 students and conducted by Venomous Animal Unit of Zoonosis department.

1. Principle and Practices of Laboratory Animal Care

The course is designed to impart theoretical knowledge and provide practical exposure to the participants in laboratory animal science and management as per the requirements for persons carrying out and responsible for directing animal experiments. The syllabus includes importance of animals in biomedical research, CPCSEA and Three R's of experiments, Identification of strains, IAEC Protocol Writing, Ethical Evaluation and Severity assessment, Euthanasia, Anesthesia, Necropsy and Histopathology techniques and Animal Experimentation techniques (Hands on). The training programme includes lectures by experts and practical hands on sessions. This workshop is of two days duration for a batch of 15-20 students and is conducted by Venomous Animal Unit of Zoonosis department. Students who are studying/ have passed their B.Sc. / B. Tech. / M.Sc. / M. Tech degrees in Microbiology/Biochemistry/ Biotechnology/ Zoology/ Botany/ Life Sciences from any Recognized University and People already in service, working in the above areas, are eligible for this course.

2. Short Term Research Internship Program (STRIP)

Haffkine Institute provides a research platform through Short Term Research Internship Program (STRIP) to the students who are pursuing their master degrees under the recognized universities. The selected candidates work on Research projects for 4-6 months duration as their academic need or for the partial fulfilment of their B. Tech, M. Tech, B.E. or M. Sc. degrees. The detailed advertisement and application form are usually displayed on the institutional website. After last date of submission, an orientation is conducted which starts with a MCQ type test followed by actual interaction with the mentors. The selection of candidates is carried out on the basis of merit and they are

placed in different Institutional Departments. The candidates get opportunity to work on research projects encompassing various multi-disciplinary areas of Biological and Chemical Sciences. Upon completion of their project, the students are usually asked to present their work in the form of Power Point Presentations (PPT) and are evaluated. They are also asked to submit their work in the form of thesis. On successful completion of project the students are awarded with duly signed certificate by the mentor & the Hon. Director. With the co-ordination of Training department, we successfully completed STRIP 2022-23 batch.

List of STRIP Interns batch as below: (2022-23) Batch 1 & 2

Sr. No	Name of Students	Name of Mentor	Department
1	Dhanishtha Anil More	Dr.Usha Padmanabhan	Cell Biology
2	Ruchi Jagannath Patil	Dr.Usha Padmanabhan	Cell Biology
3	Sanjana Chetan Gupte	Dr.Usha Padmanabhan	Cell Biology
4	Shubham Kamlesh Singh	Dr.Usha Padmanabhan	Cell Biology
5	Arundhati Sanjay Nagarkar	Dr.Amruta Naik	Biochemistry
6	Bhavini Chetan Babariya	Dr.Amruta Naik	Biochemistry
7	Eshita Parul	Dr.Usha Padmanabhan	Biochemistry
8	Rajvi Kamlesh Pandya	Dr.Amruta Naik	Biochemistry
9	Bhakti Nitin Dicholkar	Dr.Amruta Naik	Biochemistry
10	Mrudali Sanjay Ambre	Dr Anuya Rege	Bacteriology
11	Shruti Anant Dhandore	Dr Anuya Rege	Bacteriology
12	Sairaj Bhausahab Shinde	Dr Sandeepan Mukherjee	Virology
13	Merin Antony	Dr Sandeepan Mukherjee	Virology
14	Tushar Rajbhoj	Dr Sandeepan Mukherjee	Virology
15	Rutuja Ramesh Shikhare	Dr Mrunal Ghag-Sawant	Toxicology
16	Ankita Chavan	Dr Mrunal Ghag-Sawant	Toxicology
17	Shubham Ramesh Sakpal	Dr Mrunal Ghag-Sawant	Zoonosis
18	Neha Ramchandra Waghare	Dr Shashikant Vaidya	Clinical Pathology
19	Roshni R. Kundangathu	Dr Shashikant Vaidya	Clinical Pathology
20	Ketali Prakash Pisal	Dr Shashikant Vaidya	Clinical Pathology
21	Zalak Jignesh Mehta	Dr Shashikant Vaidya	Clinical Pathology
22	Durgesh Pratim Mahajan	Dr Ashish Asrondkar	Chemotherapy

1. Testing of Alcoholic Beverages

Workshop on “Testing of Alcoholic Beverages” (TAB) is a two days training programme conducted every year during April to June in Chemical Testing Unit of Haffkine Institute. This programme gives students exposure to how Alcoholic Beverages are tested using instruments like Alcoholyser, Gas Chromatography, Hydrometer, etc. Also it gives information to students regarding use of alcohol in varied fields. Students find this training programme interesting and informative. The general rating received for TAB is Very Good to Excellent. The general capacity for each batch is up to 10 students per batch.

Training Programme for the year 2022-23:

Training department initiated and supported following new activities:

LIST OF NEW TRAINING PROGRAMME 2022-23

Sr.No	Department	Training Course
1	Cell Biology	Hands on Training In Tissue Culture method
2	Toxicology	Techniques in Applied and regulatory toxicology
3	Zoonosis	Techniques in Applied Zoology

LIST OF NATS 2022-23

Sr. No	Name of Candidate	Department
1	Shraddha Nair	Store
2	Sanjana Rampurkar	Zoonosis
3	Satish Chavan	Chemotherapy
4	Janhavi Koregaonkar	Chemotherapy
5	Divya Karepaka	Toxicology

National Apprenticeship Training Scheme (NATS)

This scheme facilitates one year lead me to observe the apprentices performance before providing regular employment. NATS enhances the establishment of productivity and provides financial support to the industries by way of reimbursing 50% of Government prescribed minimum spend paid to the apprentices. Apprenticeship training scheme ensures continuous availability of trainees in the establishment. The scheme helps the establishments to develop human resources for their present and future manpower requirements. DBT Biotech Industrial Training Programme is scheme of practical industrial training for B.E. / B.Tech. / M.Sc. / M.Tech. / M.V.Sc. / MBA Biotechnology and Bioinformatics students. This programme aims to provide industry-specific training to Biotech students for skill development and enhance their job opportunities in biotech companies. This programme allows biotech/life science companies to train and select a suitable workforce. The training period is six months, during which a trainee is paid a stipend.

List of MUHS SUMMER INTERNSHIP PROGRAM - 2022

Sr. No	Name of Students	Department	Name of Learning Goal
1	Gargi Patil	Cell Biology	Clinical Research
2	Daksh Krishnani	Cell Biology	Clinical Research
3	Devduti Sinha	Virology	Infection Biology
4	Diksha Singh	Toxicology	Enviromental Health Science (Toxicology)
5	Pooja Panjawani	Toxicology	Enviromental Health Science (Toxicology)

Details of Ph.D Guide in Haffkine Institute

- For Ph.D (Mumbai University)**

1. Dr.Usha Padmanabhan - Applied Biology
2. Dr.Ashish Asrondkar - Chemistry
3. Dr.Vrushali Patil - Chemistry
4. Dr.Sandeepan Mukherjee - Applied Biology

- For Ph.D (MUHS)**

1. Dr.Usha Padmanabhan - Applied Medical Biology

• **For M. Sc. (by Research)**

- | | | |
|----------------------------|---|-----------------|
| 1. Dr. Usha Padmanabhan | - | Applied Biology |
| 2. Dr. Ashish Asrondkar | - | Chemistry |
| 3. Dr. Vrushali Patil | - | Chemistry |
| 4. Dr. Mrunal Ghag-Sawant | - | Applied Biology |
| 5. Dr. Amruta Naik | - | Biochemistry |
| 6. Dr. Sandeepan Mukherjee | - | Applied Biology |
| 7. Dr. Sandeepan Mukherjee | - | Microbiology |

Details of Ph. D students

Sr No.	Students Name	Subject	Guide Name	Department	Status
1	Miss Pinky Singh	Microbiology	Dr. Shashikant Vaidya/ Dr. Sandeepan Mukherjee	Clinical Pathology	Registered
2	Miss Harshada Sawant	Chemistry	Dr. Vrushali Patil	Chemotherapy	Registered
3	Dr. Mrunal Ghg Sawant (Internal candidate)	Applied Biology	Dr. Sandeepan Mukharjee	Zoonosis	Registered
4	Mr. Pawankumar Todkar (Internal candidate)	Applied Biology	Dr. Usha Padmanabhan	Cell Biology	Joined
5	Bhupali Kore	Applied Biology	Dr. Usha Padmanabhan	Cell Biology	Joined
6	Miss Priyanka Mishra	Applied Biology	Dr. Usha Padmanabhan	Biochemistry	Joined
7	Amalamerin George Kanjupally	Applied Biology	Dr. Usha Padmanabhan	Biochemistry	Joined

Details of MSc (By Research) students

Sr No.	Students Name	Subject	Guide Name	Department	Status
1	Miss Sheetal Shetty	Applied Biology	Dr. Mrunal Ghag Sawant	Zoonosis	Registered
2	Mr. Pradeep Jadhav (Internal candidate)	Applied Biology	Dr. Mrunal Ghag Sawant	Zoonosis	Registered
3	Miss. Madhura Ghatakar	Applied Biology	Dr. Mrunal Ghag Sawant	Toxicology	Registered
4	Miss. Shreya Thakur	Applied Biology	Dr. Mrunal Ghag Sawant	Toxicology	Joined

National One Health Programme for Prevention and Control of Zoonoses (NOHP-PCZ)

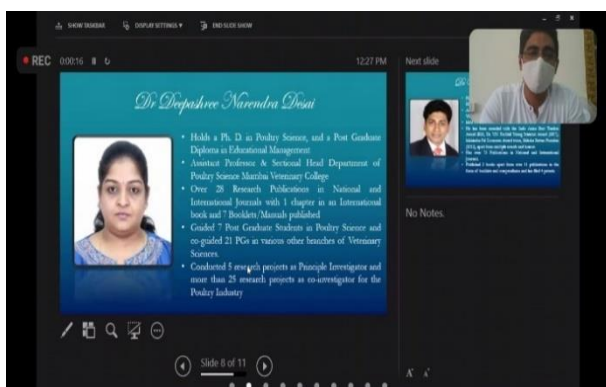
Haffkine Institute is a regional coordinator under the National Centre for Disease Control (NCDC), MoHFW, Government of India for the National One Health Programme for Prevention and Control of Zoonosis. We cater to the states of Maharashtra, Chhattisgarh and Goa. As a part of the programme one of our mandates is to conduct training programs for Public Health Personnel's and Veterinarians across these 3 states.

Last year we conducted 3 National level webinars (Rabies Vaccination Guidelines, World Zoonoses Day program and World Rabies Day program) and 2 Three-Day Hands on workshops for Laboratory detection of Rabies. Apart from these we have coordinated the Maharashtra State Level Zoonosis Disease Committee meeting and Brainstorming meeting for Rabies free Mumbai for the Mumbai Metropolitan Region.

1. On occasion of World Zoonosis Day, Vector 2022
2. Lecture series on Human Rabies Management

28th SEPTEMBER 2022, WORLD RABIES DAY CELEBRATIONS Haffkine Institute For Training, Research & Testing MUMBAI Under The National one Health Program for the prevention

and Control of Zoonosis, NCDC Dr. Atul Goyal, Director General of Health Services and Director NCDC visited the Haffkine Institute on 10th March 2023. We conducted a Stakeholders meeting for ZERO Rabies in the Mumbai Metropolitan region and a one State Zoonosis Committee Meeting.



World Zoonosis Day – 2022

On 15th July 2022, Department of Zoonosis celebrated online **World Zoonosis Day** organized by Zoonosis department, in coordination with department of Virology and Training. Zoonosis Department conducted World Zoonosis Day as a resource faculty under Haffkine Institute NCDC-NOHPPCZ.

Sr. No.	Name of Workshop	Date	No. of Participant	Funded by
1	World Zoonosis Day	15/07/2022	76	NCDC, New Delhi

Nehru Science Centre Exhibition 2023

Coordinated for Innovation Festival at Nehru Science Centre from 1st Feb 2023 to 3rd Feb 2023

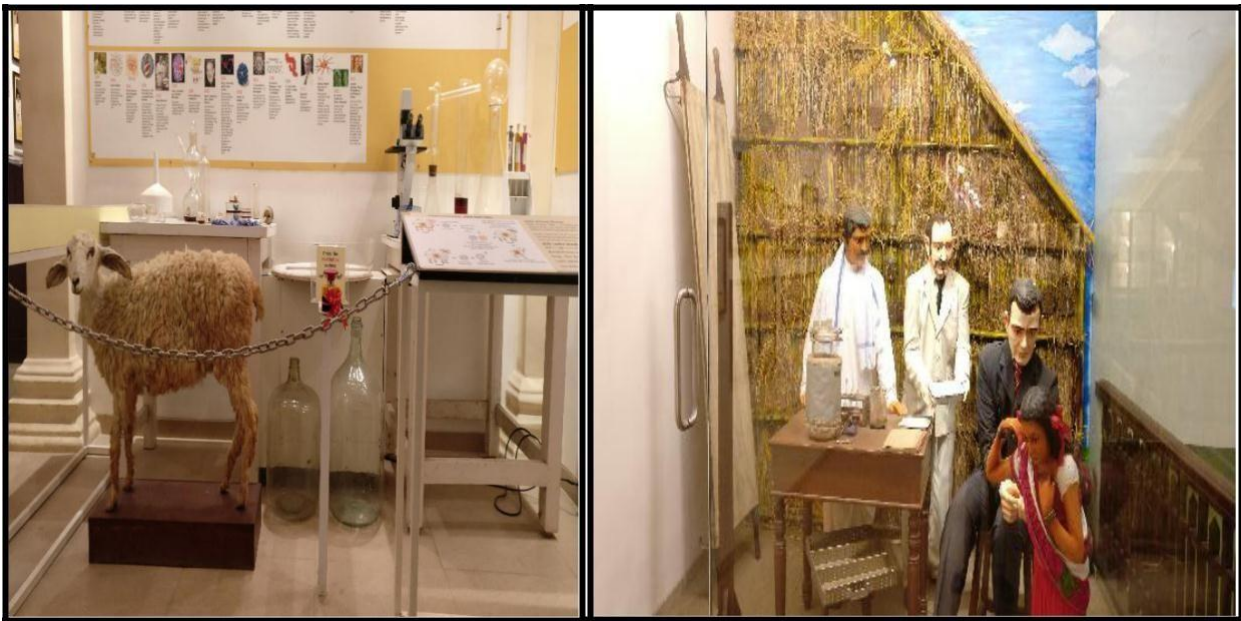


NABL Training Programme

Training department coordinated four days Training Programme on “General Requirements for the Competence of Testing & Calibration Laboratories and Internal Audit as per ISO/IEC 17025:2017” at Haffkine Institute for Internal Scientific Officer and Technical staff.



NABL Training Programme



Museum

Museum

2022-23



Dr. Shashikant Vaidya

In charge of Museum

Overview

The Museum in the Historic renowned mansion with Portuguese architecture is a magnificent museum which unveils Life Sciences, Microbiology and the glorious past of this Institute and the inspirational work of Dr. Waldemar Mordecai Haffkine.

It has a short Film “The World of Dr. Haffkine” made by Films Division in 1976.

It also has snake section, with original skeletons of grown up and baby snakes. A wet display of semi non-venomous and venomous snakes can be found here, apart from replica of various crawling and flying insects like mosquitoes, flies, cockroaches and bed bugs. Some original insect collections on display have been collected way back in 1924. The shaded snake skins and instruments used for handling snakes are also displayed. A film explaining milking of snake venom and original snake venom is also available for viewing. Transparent sculptures of enlarged forms of five most significant microbes namely Human Immunodeficiency Virus (HIV), Rabies Virus, Influenza Virus, *E. coli* and Bacteriophage are on display.

Museum Administrative Team



DR. Shashikant Vaidya – In charge -Museum



**Mr. Pradeep J Jadhav
Museum Co-ordinator**



**Mr. Nilesh Gaikwad
Museum Co-ordinator**

1. List of Dignitary Guests visited Museum at Haffkine Institute (April 2022- January 2023)

Sr. No	Date of Visit	Name of Visitor	Organization
1	20/04/2022	Mr. Noshir Lanangia	Treasurer – Maharashtra Tour Guide’s & Tourist facilitator Association
2	27/04/2022	Dr. Prajakta Parvatikar	Principal- Rchana Sasand Collge of Applied Art and Craft
3	20/05/2022	Mr. Sainath V. Gandwal	Section Officer- MEDD Maharashtra State.
4	15/06/2022	Dr. Rajesh Tope	Hon. Public Health Minister – Maharashtra State
5	04/07/2022	Mr. H.R. Gaikwad	Chairman –BVG Pvt. Ltd
6	20/07/2022	Dr. Tatyrao P Lahane	Former Dean J. J. Group of Hospital and Chairperson Institutional Ethic Committee-HITRT
7	20/07/2022	Prof. S. V. Joshi	Professor - ICT
8	17/08/2022	Dr. Olina Riabinina	Durham University -UK
9	17/08/2022	Prof. Dr. Thomas Schroitt	University of Wurzburg, Germany
10	17/08/2022	Dr. Susanta k. Ghosh	Scientist ‘G’ and Head, ICMR- Institute of Malaria Research- Bangalore
11	22/08/2022	Mr. Michael Rayner	Brighton University- UK
12	23/08/2022	Dr. Suman Chandra. IAS	Managing Director –HBPCL
13	07/10/2022	Mr. Abhishek Chandra IAS	Secretary Government of Tripura
14	18/10/2022	Dr. Deepa Sharma	NPO – VPD Lab Network, WHO-India
15	02/11/2022	Mrs. Seema Vyas. IAS	Director –Haffkine Institute
16	21/11/2022	Mr. Yuvraj Asetrao	Dy. Secretary – Home Department – Maharashtra State
17	26/12/2022	NDMC Priyankara	Colombo- Shri Lanka
18	04/12/2022	Dr. V. H. Patankar	BARC, Trombay
19	29/12/2022	Dr. Vargis	Ex- Scientist ICMR
20	30/12/2022	Mr. Madathil Rajendran Nair	Ex-CAO, Haffkine Institute

2. Name of the Institutes / Organisation visited Museum

Sr. No	Date of Visit	Name of Organization/Institute	No. of Participants
1	22/06/2022	School of Medical Assistant INHS-Asvini- Indian Navy	36
2	24/06/2022	MBBS Community Medicine Students from G.S. Medical college	27
3	24/06/2022	HBPCL- Pharma Trainee	18
4	27/06/2022	SWITCH India Organisation	17
5	28/06/2022	Maharashtra paramedical institute- Batch-I	19
6	29/06/2022	Maharashtra paramedical institute- Batch-I	10
7	30/06/2022	Maharashtra paramedical institute- Batch-I	18
8	25/07/2022	MBBS Community Medicine Students from G.S. Medical college	15
9	10/08/2022	MBBS Community Medicine Students from G.S. Medical college	26
10	06/09/2022	MBBS Community Medicine Students from T. N. Medical college	22
11	26/09/2022	V.S.E. College of Pharmacy	14
12	22/09/2022	Maharashtra Tour Guides & Tourist Facilitator Association	09
13	23/09/2022	MBBS Community Medicine Students from G.S. Medical college	06
14	12/10/2022	MBBS Community Medicine Students from G.S. Medical college	23
15	12/10/2022	Rabies Management Workshop Trainee	25
16	14/10/2022	Vibhoyr High School Airoli	10
17	18/10/2022	R.A. Poddar Medical College	04
18	18/10/2022	VPD Lab Network-WHO	04
19	18/11/2022	Rotrwaetz Medicrew – Cooper Medical College	14
20	22/11/2022	MBBS Community Medicine Students from G.S. Medical college	26
21	27/11/2022	Heritage Walk – Guide- Mr. Noshir, Treasurer	05
22	29/11/2022	NCDC-Rabies Workshop	11
23	30/11/2022	NCDC-Rabies Workshop	14
24	01/12/2022	NCDC-Rabies Workshop	11
25	03/12/2022	Heritage Walk – Guide- Mr. Noshir, Treasurer- MTTFA	16
26	04/12/2022	Heritage Walk – Guide- Mr. Nikhil	17
27	08/12/2022	Central Procurement Cell Haffkine Institute batch	28
29	10/12/2022	Heritage Walk – Guide- Mr. Nikhil	11
30	18/12/2022	Heritage Walk – Guide- Mr. Nikhil	07
31	20/12/2022	MBBS Community Medicine Students from G.S. Medical college	06
32	26/12/2022	School of Medical Assistant INHS-Asvini- Indian Navy	33
33	07/02/2023	Jai Hind College – Life Sciences & Botony Student	60

3. Details of total participants and financials from April 2022 to till date.

Total Number of Organizations/Institute	Total number of Participants	Total Revenue Generated (April-2022 to till date)
33	562	12780.00

Collaborations and Events:

- Collaboration and Participation in the International exhibition on “Hunt For vaccine” through digital means organised by the Nehru Science Center Mumbai.
- Celebrated “World Museum Day” on 18th May-2022.
- Celebrated Museum week on the occasion of “World Museum Day” from 16th May to 20th May 2022. Museum was kept open for all staff, Student and visitors during working hours.
- “Heritage Walk to Haffkine Institute” an Innovative museum tour was initiated in collaboration with Maharashtra Tour Guide’s & Tourist Facilitator Association and MTDC. The Walk was inaugurated on 27/11/2022 by Mr. Prabhat Mangal Lodha, Hon Minister of Tourism- Maharashtra State.



On the occasion of “World Museum Day” on 18th May-2022 team of Anam Prem NGO visited our Museum and felicitated our Museum team



Mr. Sainath V. Gandwal, Section Officer- MEDD Maharashtra State visited our Museum on the closing day of Museum Week.



Padmashree. Dr. Tatyrao Lahanne sir Ex- Dean Sir. J. J. Group of Hospitals & Hon. Chairperson of the of Institutional Ethic Committee of Haffkine Institute.



Mr. Madathil Rajendran -Former CEO, Haffkine Institute

Photo Gallery of the visitors from various Institutes and organisations



1. MBBS Community Medicine Students from GS Medical college- Batch-I



2. MBBS Community Medicine Students from GS Medical college- Batch-II



3. MBBS Community Medicine Students from GS Medical college- Batch-III



4. MBBS Community Medicine Students from GS Medical college- Batch-IV



5. HBPCL- Pharma Trainee



6. Maharashtra paramedical institute- Batch-I



7. Maharashtra paramedical institute- Batch-II



8. R.A.Poddar Medical College



9. Heritage Walk Batch-I



10. Heritage Walk Batch-II



11. School of Medical Assistant INHS-Asvini- Indian Navy



12. Mr. Michael Rayner from Brighton, UK



13. Central Procurement Cell Haffkine Institute batch -I



14. Central Procurement Cell Haffkine Institute batch -II

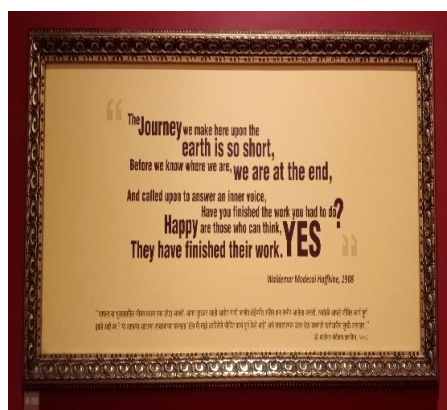
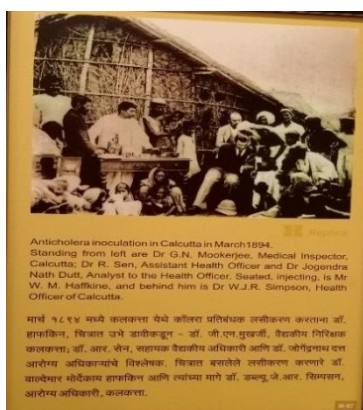
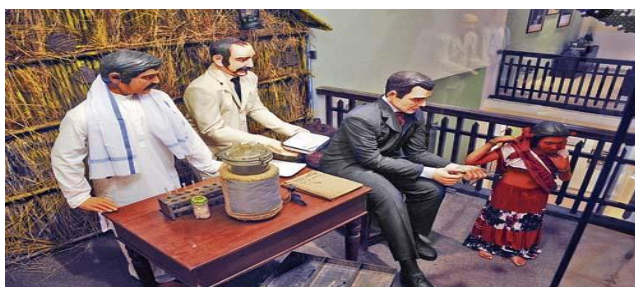


15. Jaihind College Batch -I



16. Jaihind College Batch -II

Museum Photo Gallery



Publication

Publications

2022-23

- 1 Ghag Sawant Mrunal, Yadav Anjana Kalpesh, Shetty Sheetal Sudhakar. Evaluation of anti-osteoarthritic activity of methanolic extract of cynodon dactylon in monosodium iodoacetate induced rats. World Journal of Pharmaceutical Research SJIF Impact Factor 8.084 Volume 11, Issue 14, 546-560. Research Article ISSN 2277– 7105. Article Received on 30 August 2022, revised on 20 Sept. 2022, Accepted on 10 Oct. 2022 DOI: 10.20959/wjpr202214-25719.
- 2 Gupta,P., Salvi,S., Mukherjee,S., Borse,R., Joshi,S., Deshmukh,R.,Naik,A., Patil,S., Parkar,S., Sarang,S., Shirsat,P., Padmanabhan,U*.Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/BCGCOVID19013/2020, complete genome 29,714 bp linear RNAAccession: OP132963.1 GI: 2281223034 Journal/Database: GenbankDate of Publication/release: 03-AUG-2022
- 3 Gupta,P., Salvi,S., Mukherjee,S., Borse,R., Joshi,S., Deshmukh,R.,Naik,A., Patil,S., Parkar,S., Sarang,S., Shirsat,P., Padmanabhan,U*.Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/BCGCOVID19038/2020, complete genome 29,714 bp linear RNA Accession: OP132964.1 GI: 2281223048 Journal/Database: GenbankDate of Publication/release: 03-AUG-2022
- 4 Gupta,P., Salvi,S., Mukherjee,S., Borse,R., Joshi,S., Deshmukh,R.,Naik,A., Patil,S., Parkar,S., Sarang,S., Shirsat,P., Padmanabhan,U*.Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/BCGCOVID19001/2020 ORF1ab polyprotein (ORF1ab) gene, partial cds; and ORF1a polyprotein (ORF1ab), surface glycoprotein (S), ORF3a protein (ORF3a), envelope protein (E), membrane glycoprotein (M), ORF6 protein (ORF6), ORF7a protein (ORF7a), ORF7b (ORF7b), ORF8 protein (ORF8), nucleocapsidphosphoprotein (N), and ORF10 protein (ORF10) genes, complete cds 29,714 bp linear RNAAccession: OP132961.1 GI: 2281223008 Journal/Database: GenbankDate of Publication/release: 03-AUG-2022
- 5 Gupta,P.,Salvi,S., Mukherjee,S., Borse,R., Joshi,S., Deshmukh,R.,Naik,A., Patil,S., Parkar,S., Sarang,S., Shirsat,P., Padmanabhan,U*.Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/BCGCOVID19003/2020 ORF1ab polyprotein (ORF1ab), ORF1a polyprotein (ORF1ab), surface glycoprotein (S), ORF3a protein (ORF3a), envelope protein (E), membrane glycoprotein (M), ORF6 protein (ORF6), ORF7a protein (ORF7a), ORF7b (ORF7b), ORF8 protein (ORF8), nucleocapsidphosphoprotein (N), and ORF10 protein (ORF10) genes, complete cds 29,714 bp linear RNAAccession: OP132962.1 GI: 2281223021 Journal/Database: GenbankDate of Publication/release: 03-AUG-2022

6 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S., and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-35317/2021, complete genome 29,701 bp linear RNA Accession: OP430916.1 GI: 2301455339 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.

7 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S. and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-35486/2021, complete genome 29,701 bp linear RNA Accession: OP430917.1 GI: 2301455352 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.

8 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S. and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-35352/2021, complete genome 29,701 bp linear RNA Accession: OP430918.1 GI: 2301455365 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.

9 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S. and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-35302/2021 ORF1ab polyprotein (ORF1ab) and ORF1a polyprotein (ORF1ab) genes, complete cds; surface glycoprotein (S) and ORF3a protein (ORF3a) genes, partial cds; and envelope protein (E), membrane glycoprotein (M), ORF6 protein (ORF6), ORF7a protein (ORF7a), ORF7b (ORF7b), ORF8 protein (ORF8), nucleocapsid phosphoprotein (N), and ORF10 protein (ORF10) genes, complete cds 29,669 bp linear RNA Accession: OP430919.1 GI: 2301455378 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.

10 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S. and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-35311/2021, complete genome 29,701 bp linear RNA Accession: OP430920.1 GI: 2301455391 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.

- 11 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S. and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-35088/2021 ORF1ab polyprotein (ORF1ab) and ORF1a polyprotein (ORF1ab) genes, partial cds; and surface glycoprotein (S), ORF3a protein (ORF3a), envelope protein (E), membrane glycoprotein (M), ORF6 protein (ORF6), ORF7a protein (ORF7a), ORF7b (ORF7b), ORF8 protein (ORF8), nucleocapsid phosphoprotein (N), and ORF10 protein (ORF10) genes, complete cds 29,474 bp linear RNA Accession: OP430921.1 GI: 2301455404 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.
- 12 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S. and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-35460/2021, complete genome 29,701 bp linear RNA Accession: OP430922.1 GI: 2301455417 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.
- 13 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S. and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-61055/2022 ORF1ab polyprotein (ORF1ab) gene, partial cds; ORF1a polyprotein (ORF1ab) gene, complete cds; surface glycoprotein (S) gene, partial cds; ORF3a protein (ORF3a), envelope protein (E), membrane glycoprotein (M), ORF6 protein (ORF6), and ORF7a protein (ORF7a) genes, complete cds; ORF7b (ORF7b) gene, partial cds; ORF8 gene, partial sequence; and nucleocapsid phosphoprotein (N) and ORF10 protein (ORF10) genes, complete cds 29,661 bp linear RNA Accession: OP430923.1 GI: 2301455430 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.
- 14 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S. and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-52836/2022 ORF1ab polyprotein (ORF1ab) and ORF1a polyprotein (ORF1ab) genes, partial cds; surface glycoprotein (S), ORF3a protein (ORF3a), envelope protein (E), membrane glycoprotein (M), ORF6 protein (ORF6), and ORF7a protein (ORF7a) genes, complete cds; ORF7b (ORF7b) and nucleocapsid phosphoprotein (N) genes, partial cds; and ORF10 protein (ORF10) gene, complete cds 29,400 bp linear RNA Accession: OP430924.1 GI: 2301455442 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.

- 15 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S. and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-53134/2022 ORF1ab polyprotein (ORF1ab) gene, partial cds; ORF1a polyprotein (ORF1ab), surface glycoprotein (S), ORF3a protein (ORF3a), envelope protein (E), membrane glycoprotein (M), ORF6 protein (ORF6), and ORF7a protein (ORF7a) genes, complete cds; ORF7b (ORF7b) gene, partial cds; ORF8 gene, partial sequence; and nucleocapsid phosphoprotein (N) and ORF10 protein (ORF10) genes, complete cds 29,655 bp linear RNA Accession: OP430925.1 GI: 2301455454 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.
- 16 Gupta,P., Sarang,S., Todkar,P., Jadhav,M., Zope,C., Bhurkunde,M., Mukherjee,S. and Padmanabhan,U*. Severe acute respiratory syndrome coronavirus 2 isolate SARS-CoV-2/human/IND/HI-CV-53143/2022 ORF1ab polyprotein (ORF1ab), ORF1a polyprotein (ORF1ab), surface glycoprotein (S), ORF3a protein (ORF3a), envelope protein (E), membrane glycoprotein (M), ORF6 protein (ORF6), and ORF7a protein (ORF7a) genes, complete cds; ORF7b (ORF7b) and nucleocapsid phosphoprotein (N) genes, partial cds; and ORF10 protein (ORF10) gene, complete cds 29,674 bp linear RNA Accession: OP430926.1 GI: 2301455466 Journal/Database: Genbank Date of Publication/release: 14-SEP-2022.
- 17 Herscu, P., Talele, G., Vaidya, S., Shah, R. Safety and Evaluation of the Immune Response of Coronavirus Nosode (BiosimCovex) in Healthy Volunteers: A Preliminary Study Extending the Homeopathic Pathogenetic Trial. *Medicines* 2023, 10, 8. <https://doi.org/10.3390/medicines10010008>
- 18 Panchal R, Ghosh S, Mehla R, Ramalingam J, Gairola S, Mukherjee S, et al. Antiviral Activity of Rosmarinic Acid Against Four Serotypes of Dengue Virus. *Curr Microbiol.* 2022;79(7):1–7
- 19 Pansarea Dattatraya N.* Shelkeb Rohini N., Chavanc Pravin N., Kanagarea Anant B., Dhasa Ajit K., Pati Vrushali N., Dangee Vaishali U., Gaikwad Satish V., Pawar, Rajendra P.Synthesis of Imidazole and Benzimidazole: A review. National Symposium on “Innovative Inclinations and Sustainable Technologies In Chemical Sciences (ISSTCS-2023)”
- 20 Pendhari Juber, Savla Hemali, Bethala Durga, Vaidya Shashikant, Shinde Ujwala. Mitochondria targeted liposomes of Metformin for improved Anticancer activity: Preparation and Evaluation. *Journal of Drug Delivery Science and Technology*, JDDST-D-22- 01240.
- 21 Rege AA, Kolte DB and Martin SS: *In vitro* Evaluation of Antimicrobial and Antioxidant Activities of Alum and it’s *Bhasma* (*Sphatika Bhasma*). *International Journal of Advanced Research*, (2022); 10(8): 891-902.

- 22 Rege AA, Kolte DB and Martin SS: *In vitro* Evaluation of Anti-Biofilm potential of Alum and it's *Bhasma* (*Sphatika Bhasma*). International Journal of Advanced Research, (2022); 10(9): 103-112.
- 23 Rege A, Kolte D and Martin S: Antimicrobial and Antibiofilm effects of Alum (*Sphatika*) and it's *Bhasma*. LAP Lambert Academic Publishing, Germany, 2022. (BOOK) [ISBN: 978-620-5-52783-2]
- 24 Rege AA: *In vitro* Evaluation of Antibiofilm potential of Alum (*Sphatika*) and it's *Bhasma* (*Sphatika Bhasma*) against Mixed Bacterial Biofilms. World Journal of Pharmacy & Pharmaceutical Sciences, (2023); 12(2): 1211-1224.

Department of Clinical Pathology

1. Poster Presentation:

Oral Presentation:

1. "4th International Vaccine R&D Congress" during August 24-25, 2022 at London, UK on the theme "New Innovations in the field of Vaccines & Immunology".

Title: VACCINE ADJUVANTS: STRIKING THE RIGHT BALANCE" at Vaccine Conference 2022

Author: Shashikant Vaidya, Department of Clinical Pathology, Haffkine Institute, Mumbai.

2. "International Symposium on Translational Research-2022 conference, Mysore"
(8th & 9th September, 2022)

Title: Assessment Of In Vitro Immunomodulatory Activity of Select Antiviral Agents

Authors: Pinky Singh¹, Disha Ekawade², Shashikant Vaidya¹, Sandeepan Mukherjee²

¹Department of Clinical Pathology, Haffkine Institute, Mumbai

²Department of Virology, Haffkine Institute, Mumbai

Poster Presentation: (2nd Prize)

1. “Microcon-2022 conference, Bhubaneswar” (24th to 27th November, 2022)

Title: Gene Expression Analysis of host (A549) Cells infected with various strains of influenza virus

Authors: P. R. Singh¹, S. Khatkhatay¹, Dr. S. Mukherjee² and Dr. S. P. Vaidya¹

¹Department of Clinical Pathology, Haffkine Institute, Mumbai

²Department of Virology, Haffkine Institute, Mumbai.

2. Poster Accepted:

Title: Antituberculosis Activity of Black Turmeric Rhizome Extracts in Polar and Non-Polar Solvents

Accepted for a presentation at ASM Microbe 2022 in Washington, DC, June 9-13, 2022.

Authors: Shashanka Sahu¹, Pinky Singh¹, Swati Sanap¹ and Shashikant Vaidya¹

Haffkine Institute for Training, Research & Testing, Mumbai, India¹

Training Services

TRAINING SERVICES

2022-23

Department of Bacteriology

Sr. No.	Name of Training Program	Duration	No. of Students	Revenue Generated (Rs.)
1	Short Term Research Internship Program (STRIP)	Jan. 2022 to June 2022 (6 months)	2	50,000/-
2	Short Term Research Internship Program (STRIP)	Jan. 2023 to June 2023 (6 months)	1	25000/-

Department of Biochemistry

Training Services

The department has 2 guides for MSc and PhD degree in subjects of Applied Biology & Biochemistry as below:

Courses / Degree	Guide / Mentor
Master of Science (M.Sc.)	- Dr. Usha Padmanabhan - Dr. Amruta Naik
Doctorate of philosophy (Ph.D.), MU and MUHS	Dr. Usha Padmanabhan

Details of MSc / PhD students

Sr. No	Name	Project Title	Status
1	Ms.Priyanka Mishra (Mar 2023 onwards)	Biodiversity in Snakes and poisonous organisms; use of genomics (tentative)	Ongoing

Other Training Activities

A new program called Advanced Research Techniques (ART) was initiated in the department.

Sr. No	Name of Training Program conducted by Department	Period over which conducted	No. of students	Min. Qualification of students eligible for the course
1	M.Sc. Ph.D.	2022 onwards	2	MSc, BSc
2	S.T.R.I.P	2022 onwards	5	MTech B Tech MSc, BSc,
3	A.R.T	2022 onwards	4	BSc, BTech

Details of S.T.R.I.P students

Sr. No.	Name	Duration (Months)	Mentor
1	Ms. Rajvi Kamlesh Pandya	6	Dr. Amruta Naik
2	Ms. Eshita Parui	4	Dr. Usha Padmanabhan
3	Ms. Bhakti Nitin Dicholkar	4	Dr. Amruta Naik
4	Ms. Arundhati Nagarkar	6	Dr. Amruta Naik
5	Ms. Bhavini Chetan Babariya	6	Dr. Amruta Naik

Details of A.R.T. students

Sr. No.	Name	Duration (M)	Mentor
1	Ms. Priyanka Pramod Shivpuje	2	Dr. Amruta Naik
2	Ms. Prakkanthi Rajesh Raju	2	Dr. Amruta Naik
3	Ms. Gayatrisreekumaran Pillai	2	Dr. Usha Padmanabhan
4	Dr. Sangeeta Saroja G.	4	Dr. Usha Padmanabhan

Department of Cell Biology

Training Services

The department has 1 guides for MSc and PhD degree in subject of Applied Biology & Applied Medical Biology as below:

Courses / Degree	Guide / Mentor
Master of Science (M.Sc.)	• Dr. Usha Padmanabhan
Doctorate of philosophy (Ph.D.), MU and MUHS	• Dr. Usha Padmanabhan

Details of MSc / PhD students

Sr. No	Name	Project Title	Status
1	Ms. Bhupali Kore (Feb 2023 onwards)	Determination of variation in IGHV and IGLV gene in a healthy population	Ongoing Biosafety and Ethics permission rcvd
2	Mr. Pawan Kumar Todkar (Feb 2023 onwards)	Assessment of Tribal population in Maharashtra's Bhandara, Gondia & Gadchiroli districts: Awareness, Treatment Access and Seroprevalence survey for Rabies.	Ongoing
3	Ms. Gauri Pradhan	Resigned due to personal reasons	

Other Training Activities

A new program called Advanced Research Techniques (ART) was initiated in the department.

Sr. No	Name of Training Program conducted by Department	Period over which conducted	No. of students	Min. Qualification of students eligible for the course
1	MSc PhD	2022 onwards	2	MSc, BSc
2	S.T.R.I.P	2022 onwards	4	M.Tech B.Tech MSc, BSc
3	A.R.T	2022 onwards	5	BSc, B.Tech

Details of S.T.R.I.P students

Sr. No	Name	Project Title	Status
1	Mr. Shubham Singh	Standardization of target bases sequencing (TGS) of Measles genome	Completed
2	Ms. Sanjana Gupte	Plasmodium falciparum genomics: Standardization of Target based PCR and sequencing of genes involved in drug resistance	Completed
3	Ms. Dhanishtha More	Title yet to be decided	Ongoing
4	Ms. Ruchi Patil	Title yet to be decided	Ongoing

Details of A.R.T. students

Sr. No	Name	Status
1	Mr. Shantanu Surendra Dighe	Completed
2	Mr. Siddhivinayak Chinchalkar	Completed
3	Ms. Sukhada Surkant Kanse	Completed
4	Mr. Reon Lobo	Completed
5	Dr. Sangeeta G.	Completed

Department of Chemical Testing

Training

Name of Training Program	Date of Training Program	No. of Students	Revenue Generated (Rs.)
Workshop on Testing of Alcoholic Beverages	28-06-2022 to 29-06-2022	08	16,000/-

Department of Clinical Pathology

Students

Four S. T. R. I. P. students were appointed

- 1. Title:** *In-vitro* Wound healing activity of *Curcuma caesia* Rox b extracts.

Student Name: Ms. Roshni Ravindran Kundanaghatu

Name of Mentor: Dr.S.P.Vaidya

Department: Department of Clinical Pathology.

- 2. Title:** Invitro assessment of immunomodulatory activity of Anti –Tb drugs on U937 cell line.

Student Name: Ms. Neha Waghare

Name of Mentor: Dr.S.P.Vaidya

Department: Department of Clinical Pathology.

- 3. Title:** Host Gene Expression Profiling in U937 cells Infected with Different Strains of Influenza Virus

Student Name: Ms. Zalak Mehta

Name of Mentor: Dr.S.P.Vaidya

Department: Department of Clinical Pathology.

- 4. Title:** Host Gene Expression Profiling in A549 cells Infected with Different Strains of Influenza Virus

Student name: Ms. Ketali Pisal

Name of Mentor: Dr.S.P.Vaidya

Department: Department of Clinical Pathology.

Training

Sr. No.	Name	Amount
1	Ms. Roshni Ravindran Kundanaghathu	Rs.25,000/-
2	Ms. Neha Waghare	Rs.25,000/-
3	Ms. Zalak Mehta	Rs.25,000/-
4	Ms. Ketali Pisal	Rs.25,000/-
	Total	Rs.1,00,000/-

Department of Chemotherapy

Training

Sr. No	Name of Training Service	No. of Students	Total Revenue Generated (Rs)
1	3 Month Training for Biotechnology students	02	30,000/-
2	45 Days Training for analytical Chemistry students	Nil	Nil
3	1 Month Training for graduates & undergraduates	02	10,000/-
4	6 Months STRIP students	01	25,000/-
5	Advance Training on HPLC	01	10,000/-
	Total	06	75,000/-

Natina Apprenticeship Training Programme (NATS)

Two students admitted under programme NATS for NABL: Ms Janvi Korgaonkar, Mr Saish Chavan.

Department of Toxicology

Training

1 Strip Students training program

Two S. T. R. I. P. students were appointed

1. **Title: “Induction of oxidative stress and lethal toxicity and developmental effects of venom on zebra fish embryo”**

Miss Ankita Chavan

Name of Mentor: Dr. Mrunal Ghagh Sawant

Department: Department of Toxicology

2. **Title: “Under Finalization”**

Miss Rutuja Shikhre

Name of Mentor: Dr. Mrunal Ghagh Sawant

Department: Department of Toxicology

Sr. No.	Name of the Training Service	Amount (Rs.)
1	STRIP students	25,000/-
2	STRIP students	25,000/-
	Total	50,000/-

1. **“Zebrafish as an Evolving Model for Research”**

Sr. No	No of Student	Duration	Amount Rs.
1	03	7th June and 8th June	9,000/-



2. “Basic Training on small laboratory Animals Handling”

Sr. No.	No. of student	Duration	Amount Rs.
1	01	10 th August -10 th Sept.	8,000/-
2	01	22 nd March – 22 nd April	8,000/-



Handling of mice for administration of drugs by intravenous routes.

3. “Summer Internship Programme MUHS”

Sr.No.	No of student	Duration	Amount Rs.
1	02	17 th May to 17 th June	2000.00



Handling of mice for the oral administration route.



Observation while administration of drugs by intravenous routes.

Department of Zoonosis

Training

Sr.No.	Name of Strip Student	Revenue
1.	Mayurakshi Thakur	25000/-
2.	.Bhagyeshri Gaikwad	25000/-
3.	Shubham Sakpal	25000/-



Testing Services

Testing Services

2022-23

Department of Bacteriology

Testing

Total Revenue Generated from Testing = **Rs. 3,36,000/-**

Department of Bacteriology		
Sr. No	Name of Testing Service (alphabetical)	No. of Samples
1	Air Sterilizer	1
2	Animal Feed & Bedding Testing (Free- Institutional- VAU Department)	3
3	Antimicrobial Testing of Antimicrobial Coated Products	1
4	Disinfectants	11
5	Water Purifier	1
6	Water Samples (One Free- Institutional- VAU Department)	37
	Total No. of Samples	54

Contact Email: bacteriology@haffkineinstitute.org

Department of Biochemistry

Testing

The department wishes to go for NABL accreditation for its testing activities. With this in view, the Lab 3 has been designated for the purpose.

Snake venom testing

The department has been performing the in vitro biochemical assays for the snake venom analysis and anti snake venom (ASV) analysis. The department has actively worked with the seized potentially poison samples from the Govt of West Bengal and Assam. Currently the department is standardizing ELISA and Comet Assays for the same.

Testing of RNA quantity and quality for nSARS Cov2 Genome sequencing

The department has been measuring OD 280 and 260 to estimate RNA quality and quantity to set QC conditions prior to sequencing. This is largely because the department has a nanodrop which can measure RNA concentration in volumes as low as 2 ul.

In vitro testing

The department has been performing the in vitro cell based assays i.e. MTT assay, wound healing assay and currently have received the samples for the same

Cosmetic testing

The department is also in talks with various cosmetic companies for testing as per IBS, FDA and NABL guidelines. In particular we have studied OECD guidelines for skin product testing and hope to start the activity in the near future.

Biochemical Testing

The department used to conduct Biochemical testing on a routine basis. However due to lack of an MD Pathology, the testing activities have been stopped. Over the past year the department has requested that the Institute hire an MD pathology, to enable department to continue its testing activities.

The department has sought permission to standardize Prostate serum antigen and BRCA genetic testing for prostate cancer and breast cancer diagnosis respectively. The department has already received Ethics permission for the same

Contact email: biochemistry@haffkineinstitute.org

Department of Cell Biology

Testing

The department is a Indian Genome sequencing laboratory (IGSL) designated by INSACOG for nSARS-Cov2 sequencing

Staff Involved are

Dr. Usha Padmanabhan, Dr. Priyanka Gupta, Priyanka Mishra, Sameer Patil, Pravin Shirsat, Shashank Sarang, Bhupali Kore, Dr. Amruta Naik, Sanika Parkar, Bhagyawan Pawar & Samrat More

The number of samples received as on date are:

Sr. No	Date of receipt	Details of Hospital	No. of samples Received
1	27.03.23	Kasturba	48
2	27.03.23	KEM	3
3	26.03.23	KEM	2
4	03.04.23	KEM	8
5	06.04.23	KEM	6
6	10.04.23	KEM	6
7	10.04.23	Dr. Lalpathlabs	1
8	13.04.23	KEM	4
9	17.04.23	KEM	4
10	17.04.23	NIRRH	11
		Total	93

Report of 1st batch of 24 nSARS Cov-2 samples sequenced is as follows:

17 Out of 24 samples gave a coverage of >50 % (range 57.05 to 96.54%) which is acceptable as per INSACOG guidelines

The following sublineages were identified

1. XBB.1.5 - 1 seq
2. XBB.1.16 - 5 seq
3. XBB.1.9.1- 6 seq
4. XBB.2.3 - 5 seq

Of the above, the current circulating variant of Interest (VOI) as per WHO and Variant of concern (VOC) as per INSACOG as of 15 March 2023 is XBB.1.5 clade 23A, XBB and XBB.1.16.

Said results were sent to Dr. Rajesh Karyakarte who has reported it to GoM as shown in figure below

BJ Government Medical College, Pune Department of Microbiology

Summary of SARS-CoV-2 Whole Genome Sequencing performed at Haffkine Institute, Mumbai

CONFIDENTIAL No. BJGMC/Micro/SARS-CoV-2/Genome Sequencing/329/2023

Date: 17-04-2023

To,
The Director,
Medical Education and Research,
Mumbai-1

Subject: SARS-CoV-2 Genome Sequencing of samples Co-ordinated by BJGMC, Pune...

Reference: Sequencing performed by Haffkine Institute, Mumbai, to detect Omicron in twenty-four samples received by the laboratory from 06-02-2023 to 24-03-2023; **129th report in all for studying Omicron spread**, first report of Haffkine Institute, Mumbai ...

Respected Sir,

As informed earlier, BJ Government Medical College is coordinating the effort to study community spread of Omicron since 26-11-2021, the day Omicron was designated as a VOC. **One-hundred and twenty-eight reports**, 49 by BJGMC; 22 by IISER; nine by CSIR-NCL, three by NCCS, 32 by NIV, Pune, five by Kasturba Hospital, Mumbai, and eight by CSIR-NEERI, Nagpur have been sent earlier.

The detailed result of the first sequencing run kindly shared by Haffkine Institute, Mumbai, of 24 samples from Maharashtra, all from Mumbai district is reported to you.

Sequencing Done in Haffkine Institute, Mumbai for detecting Omicron coordinated by BJGMC, Pune File Name: MetaData_INSACOG_Batch 1				
Maharashtra: 24				
Pangolin-Lineage	Nextclade identification	Number of Samples	%	WHO
Mumbai samples: 24 (06-02-2023 to 24-03-2023)				
XBL	Recombinant	2	Low Coverage, not included for %	
XBB.1.5	23A (Omicron)	1	4.55	
XBB1.9.1	22F (Omicron)	6	27.27	
XBB.1.16		8	36.36	Omicron
XBB.2.3		7	31.82	
Total Mumbai samples: 24				
Maharashtra Samples: 24				

1. XBB.1.16 is the most dominant in this sequencing run, followed closely by XBB.2.3, and XBB.1.9.1.
2. Kindly note that this is the first sequencing run of Haffkine Institute, Mumbai.

As per the characteristics of **VOC Omicron and its sub-lineages** highlighted by the **World Health Organization**, Public Health measures to counter these characteristics of the **Variant** need to be initiated.

With regards,



Dr Rajesh Karyakarte
Professor and Head, Department of Microbiology,
BJ Government Medical College, Pune-411001

**Dr Rajesh
Prabhakar
Karyakarte**

Digitally signed by
Dr Rajesh
Prabhakar
Karyakarte
Date: 2023.04.17
20:41:39 +05'30'

The study was carried out by Maharashtra-COG.

Page 1 of 1

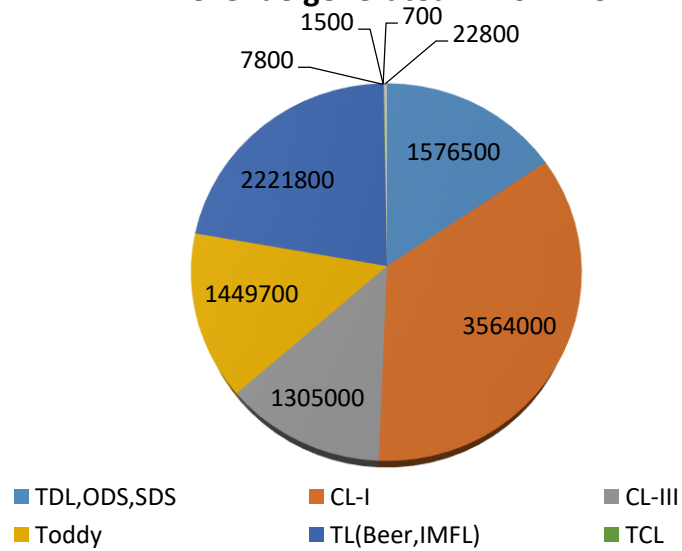
Department of Chemical Testing

Testing

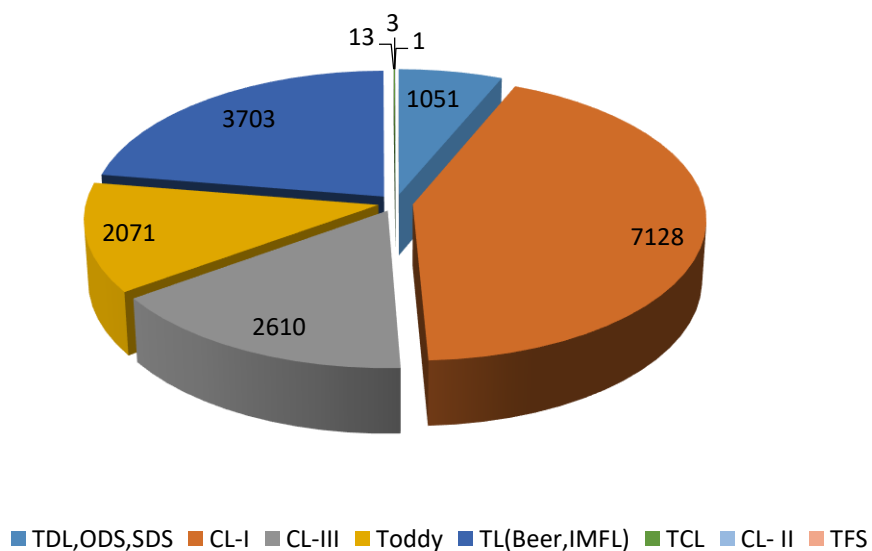
Total Revenue generated (1st April 2022 to 31 March 2023.) =Rs1,01,49,800/-

Serial No.	Name of Testing Services	No. of Samples Tested 1st April 2022 to 31 March 2023	Total Revenue Generated(Rs.)
1	TDL,ODS,SDS	1051	1576500
2	CL-I	7128	3564000
3	CL-III	2610	1305000
4	Toddy	2071	1449700
5	TL(Beer, IMFL)	3703	2221800
6	TCL	13	7800
7	CL- II	3	1500
8	TFS	1	700
9	Duplicate Reports		22800
Total(Rs)		16580	1,01,49,800

Revenue generated in 2022-23



Number of samples tested in 2022-23



Department of Chemotherapy

Testing

Commercial Samples: 02 (Venom sample)

Department of Clinical Pathology

Testing

Total Revenue generated from Testing = **Rs. 232800/-**

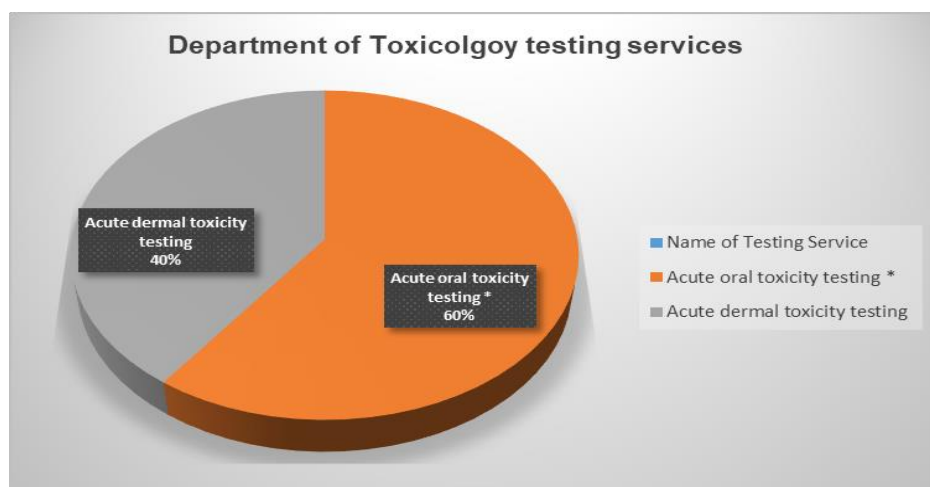
Department of Clinical Pathology		
Sr. No	Name of Testing Service	No. of Samples
1	Operation Theatre Swab	352
2	Swabs(MDS)	160
3	Anti – tuberculosis Activity testing	-
	Total No. of samples	512

Department of Toxicology

Testing

Total Revenue generated from Testing is 2,39,450.00 lakhs INR.

Department of Toxicology		
Sr. No.	Name of Testing Service	No. of Samples
1	Acute oral toxicity testing *	3
2	Acute dermal toxicity testing	2
	Total	2



- **Testing**

Services offered for pre-clinical in vivo toxicity testing include following tests.

- Acute oral toxicity in rats/ mice
- Acute Oral LD50 in rats/ mice
- Sub-acute oral toxicity in rats/ mice
- Repeated dose toxicity study in rats/ mice (90 day)
- Acute dermal irritation/ corrosion test in rabbits
- Acute dermal LD50 in rabbits.
- Sub-acute dermal toxicity in rabbits /rats (28 day)
- Mucus membrane irritation in rabbits
- Skin sensitization test in guinea pigs.
- Fish acute toxicity test
- Fish early life-stage toxicity test

Department of Virology

Testing

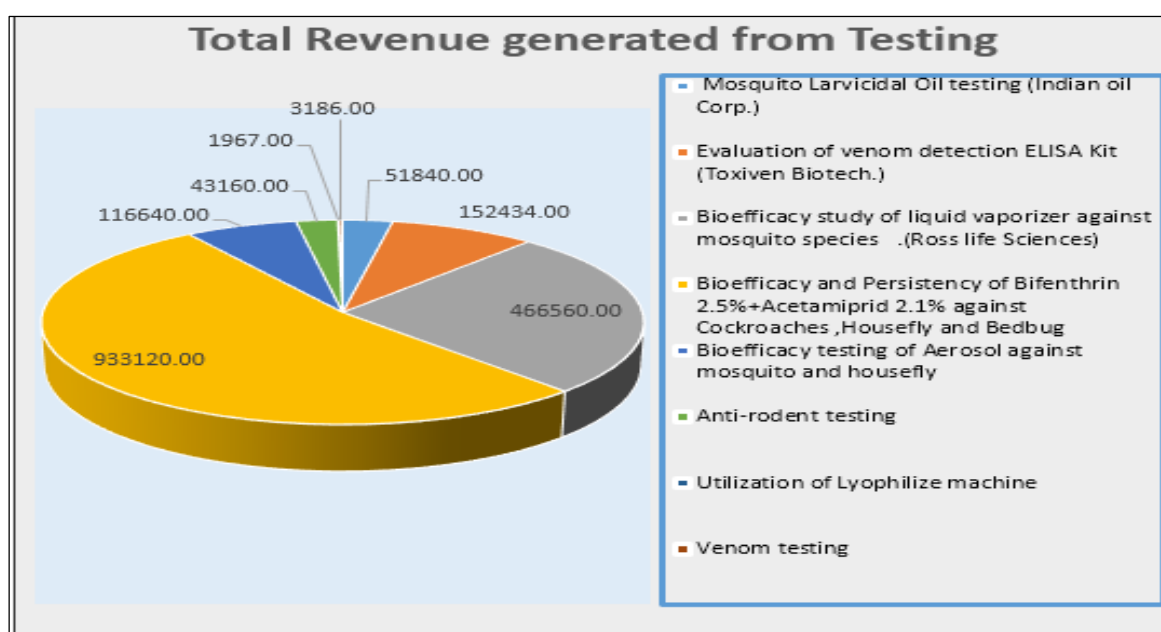
Sr. No.	Name of Test	Revenue Generated (Rs.)
1	Detection of pH1N1 by qRT-PCR	Test Carried out free of cost Under NCDC – IDSP Project)
2	Detection of Rabies by qRT-PCR	Carried out free of cost Under NCDC –Project)
3	Detection of COVID-19 by qRT-PCR	Carried out free of cost Under ICMR & DMER funds
4	Evaluation of Virucidal Activity of Disinfectant/Products	78000/-
	Total	78000/-

Department of Virology		
Sr. No	Name of Testing Service	No. of Sample
1.	Rabies Testing	03
2.	Influenza Testing	09
3.	COVID 19 Testing	8531
4.	Evaluation of Virucidal Activity of Disinfectant/Products	03

Department of Zoonosis

Testing

Department of Zoonosis			
Sr. No.	Name of Testing Service	No. of Sample	Revenue Generated (Rs)
1	Mosquito Larvicidal Oil testing (Indian oil Corp.)	01	51,840/-
2	Evaluation of venom detection ELISA Kit (Toxiven Biotech.)	01 (200 samples)	1,52,434/-
3	Bioefficacy study of liquid vaporizer against mosquito species .(Ross life Sciences)	01	4,66,560/-
4	Bioefficacy and Persistency of Bifenthrin 2.5%+Acetamiprid 2.1% against Cockroaches ,Housefly and Bedbug	01	9,33,120/-
5	Bioefficacy testing of Aerosol against mosquito and housefly	01	1,16,640/-
6	Anti-rodent testing	01	43,160/-
7	Utilization of Lyophilize machine	01	1967/-
8	Venom testing	01	3186/-
Total no. of samples		08	17,68,907/-



Other Scientific Activities

Conferences / Seminar / Training / Workshops Attended by Departmental Staff

Department of Bacteriology

1. **Name of the Staff: Dr. Anuya Rege**, Senior Scientific Officer and Head of the Dept.
Department of Bacteriology

Sr. No.	Name of Conferences / Seminar / Training / Workshop	Organizer	Location	Date	Duration
1	Training program on “General Requirements for the Competence of Testing & calibration Laboratories and Internal Audit as per ISO /IEC 17025:2017”	HITRT & IDEMI	HITRT	7 th June 2022 to 10 th June 2022	4 Days
2	Lecture on “The Infectious Disease Iceberg: What does it take to Measure & Manage Infectious Disease in India?”	TIFR	TIFR, Colaba	24 th June 2022	1 Day
3	VECTOR-2022 ANNUAL ZOONOSIS CONCLAVE Organized On occasion of “World Zoonosis Day 2022”	HITRT	Online	15 th July 2022	1 Day
4	Online Lecture Series on “Human Rabies Management under National One Health Program for Prevention and Control of Zoonoses” (World Rabies Day celebration.)	HITRT-NCDC	Online	28 th Sept 2022	1 Day
5	वाचन प्रेरणा दिवस २०२२ Celebration		HITRT Durbar Hall	14 th Oct 2022	1 Day
6	मराठी भाषा संवर्धन पंधरवडा २०२३ Celebration	मराठी भाषा संवर्धन आयोजन समिती, हाफकिन संस्था	HITRT Library & Durbar Hall	16 th Jan 2023 - 20 th Jan 2023, 25 th Jan 2023	6 Days

Sr. No.	Name of Conferences / Seminar / Training / Workshop	Organizer	Location	Date	Duration
7	Represented Haffkine Institute in Exhibition held during “Innovation Festival 2023”	Nehru Science Centre	Nehru Science Centre, Mumbai	02-02-2023	Half Day
8	“Rabies Free Mumbai- A step towards Elimination of Rabies” Meeting.	NCDC Regional coordinator & HITRT	HITRT Durbar Hall	16-2-2023	1 Day
9	मराठी भाषा गौरव दिवस २०२३ Celebration.	मराठी भाषा संवर्धन आयोजन समिती, हाफकिन संस्था	अणुजीवशास्त्र विभाग	7-2-2023	1 Day

Note:

- मराठी भाषा संवर्धन आयोजन समिती अध्यक्ष म्हणून डॉ. अनुया रेगे यांनी “वाचन प्रेरणा दिवस २०२३” कार्यक्रमाचे आयोजन केले आणि सदर कार्यक्रमात सहभागही घेतला.
- मराठी भाषा संवर्धन आयोजन समिती अध्यक्ष म्हणून डॉ. अनुया रेगे यांनी “मराठी भाषा संवर्धन पंधरवडा २०२३” कार्यक्रमांचे आयोजन केले आणि सदर कार्यक्रमांशी निगडीत कामकाज केले. तसेच, सदर कार्यक्रमा अंतर्गत आयोजित ग्रंथप्रदर्शना दरम्यान स्वतःकडील ५ पुस्तके ठेऊन सहभाग घेतला.
- मराठी भाषा गौरव दिवस २०२३ अणुजीवशास्त्र विभागात दि. २७-२-२०२३ रोजी साजरा करताना डॉ. अनुया रेगे यांनी ज्ञानपीठ पुरस्कार विजेते जेष्ठ साहित्यिक आणि कवी वि. वा. शिरवाडकर (कुसुमाग्रज) यांच्या “सागर” या कवितेचे वाचन केले. तसेच, “स्वयं Talks” मधील डॉ. शीतल सोमाणी यांचे “सायन्स फॉर सोसायटी” या विषयावरील ऑनलाईन व्याख्यानाबाबतची पार्श्वभूमी उपस्थितांना सांगितली व सर्वांनी व्याख्यानाचा आस्वाद घेतला.

2. **Name of the Staff: Mrs. Jayashree More**, Scientific Officer, Department of Bacteriology

Sr. No.	Name of Conferences / Seminar / Training / Workshop	Organizer	Location	Date	Duration
1	“Antibiotic Susceptibility Testing Guidelines Conundrum” – part 1	WHO-IAMM Network for Surveillance of Antimicrobial Resistance In Delhi (WINSAR-D)	Online	5 th April 2022	3.00 – 5.00 pm
2	Genomic Surveillance of SARS-CoV-2	WHO-South East Asia	Online	12 th April 2022	1.00 pm onwards
3	Whole Genome Sequencing Symposium and Workshop	Molecular Diagnostic and reference laboratory, Kasturba Hospital	Kasturba Hospital	26 th , 27 th & 28 th April 2022	3 Days
4	Next-Generation Sequencing: Applications in the Clinical Microbiology Lab	CLIRNET HIS - MF	online	3 rd May 2022	1 Day
5	Global WHO IPC Webinar on World Hand Hygiene Day	WHO IPC	Online	5 th May 2022	5.00-6.30 pm
6	Feasibility of Manufacturing Reusable PPE and Sustainable Solutions for Recycling of Disposable PPE Products	IFC & Indian Technical Textile Association	Online	24 th & 25 th May 2022	3.00 pm – 6.00 pm
7	Monkey pox- awareness for preparedness – 166 th virtual meeting of HIS-MF	HIS - MF	Online	26 th May 2022	2.00 pm - 4.00 pm
8	Webinar on Monkey pox “Viruses Continue to Teach- The Monkeypox Business and Indian Healthcare”	HIS – India in academic collaboration with GAPIO	Online	28 th May 2022	5.00 pm - 7.45 pm

Sr. No.	Name of Workshop/Training	Organizer	Location	Date	Duration
9	Accelerating Actions on Tackling antimicrobial resistance	Antimicrobial Resistance Summit-2022	Online	9 th June 2022	2.00 pm onwards
10	CME-Infection Prevention and Control In Central sterile supply department	HIS – MF	Online	18 th June 2022	1.00 pm - 5.00 pm
11	General Requirements for the Competence of Testing & Calibration Laboratories and Internal Audit as per ISO / IEC 17025: 2017	HITRT	HITRT	20 th June-23 rd June 2022	9.00 am – 5.30 pm
12	“The Infectious Disease Iceberg: What does it take to Measure & Manage Infectious Disease in India?”	TIFR	TIFR, Colaba	24.06.2022	5.00 – 6.00 pm
13	One day National Seminar on occasion of “World Zoonosis Day 2022”	ICAR – National Agricultural Higher Education Project (NAHEP) & (CAAST)	Online	6 th July 2022	10.00 am – 2.00 pm
14	VECTOR-2022 ANNUAL ZOONOSIS CONCLAVE Organized On occasion of “World Zoonosis Day”	HITRT, Mumbai	Online	15 th July 2022	10.00 am – 2.00 pm
15	“Monkeypox, what the monkey?”	56 th AFMC Global Town Hall-Zoom Meet	Online	14 th Aug. 2022	7.30 pm Onwards

Sr. No.	Name of Workshop/Training	Organizer	Location	Date	Duration
16	Enhancing Livestock Production and Food Safety through one Health Approach	ICAR-NAHEP-CAAST and Mumbai Veterinary College	Online	20 th Sept. 2022 - 18 th Oct. 2022	10.00 am – 1.00 pm
17	Annual Symposium on “Antimicrobial Stewardship & Patient Safety”	HISIPAMS Collaborative Webinar	Online	22 nd Sept. 2022	6.30 pm onwards
18	World Rabies Day Celebrations	HITRT-NCDC	Online/Offline	28 th Sep. 2022	9.30 am – 5.00 pm
19	National Webinar- THEME-‘OTT*’ SEPSIS	HIS-INDIA, INDRAPRASTHA Apollo Hospital Delhi & HISI-DELHI	Online	29 th Oct. 2022	12.00 pm – 5.00 pm
20	WHO Infection Prevention & Control Global Webinar- “Back to the future: inspiring the next generation on hand hygiene”	WHO	Online	1 8 th Nov. 2022	1.00 pm - 2.30 pm
21	Webinar on Management of Drug Resistant Infection Focus on MRSA	Hinduja Hospital, Sanofi	Online	26 th Nov. 2022	7.00 pm – 8.15 pm
22	Leadership in infection prevention and control: what we can learn in the context of Covid-19 pandemic?	WHO IPC Program	Online	29 th Nov. 2022	2.00 pm Onwards
23	CME- Antimicrobial Stewardship: Awareness to implementation	HIS - MF	Online	3 rd Dec. 2022	9.00 am – 4.00 pm
24	मराठी भाषा गौरव दिवस २०२३ Celebration.	मराठी भाषा संवर्धन आयोजन समिती, हाफकिन संस्था	अणुजीवशास्त्र विभाग	27-2-2023	1 Day

Note:

- Mrs. JAYASHREE MORE has participated and scored 64% of marks in National E-Quiz conducted on the occasion of “World Rabies Day - 2022” on 28th September, 2022 organized under ICAR-NAHEP-CAAST Project entitled “Centre of Excellence for Advanced Research on Animal Food Safety”.
- श्रीमती जयश्री मोरे यांनी गझल मंथन साहित्य संस्था, आयोजित ‘गझल लेखन कार्यशाळा व मराठी गझल मुशायरा’ मध्ये उत्कृष्ट सहभाग नोंदवला.

3. Name of the Staff: Mrs. Amita Patil, Scientific Officer, Department of Bacteriology

Sr. No.	Name of Conferences / Seminar / Training / Workshop	Organizer	Location	Date	Duration
1	General Requirements for the Competence of Testing & calibration Laboratories and Internal Audit as per ISO /IEC 17025:2017	HITRT	HITRT	20th June - 23 rd June 2022	9.00 a.m. - 5.30 pm
2	The Infectious Disease Iceberg: What does It Take to Measure & Manage Infectious Disease in India?	TIFR	TIFR, Colaba	24 th June 2022	5 pm - 6pm
3	VECTOR-2022 ANNUAL ZOONOSIS CONCLAVE Organized On occasion of “World Zoonoses Day”	HITRT, Mumbai	Online	15 th July 2022	10 am-2 pm
4	Online Lecture Series on Human Rabies Management (World Rabies Day celebration.)	HITRT-NCDC	Online	28 th Sept 2022	9 am- 5 pm

Sr. No.	Name of Conferences / Seminar / Training / Workshop	Organizer	Location	Date	Duration
5	Represented Haffkine Institute in Exhibition held during “Innovation Festival 2023”	Nehru Science Centre	Nehru Science Centre, Mumbai	01-2-2023 to 03-2-2023	3 Days
6	OPTIMIZATION OF Blood Culture Practice for better outcomes.	BD	Online	06-03-2023	3.0 pm-5.30 pm
7	BUGTALES 8 on Nontuberculosis Mycobacterial Infections	BD	Online	11-03-2023	2.30 pm-5.30 pm

Note:

- Mrs. Amita Sunil Patil visited to ISRO SPACE EXHIBITION on 25th Feb 2023 held at Exhibition GROUND, VJTI , Mumbai.
- सौ. अमिता सुनिल पाटील यांनी “मराठी भाषा गौरव” दिनानिमित्त विभागामध्ये श्री. रितेश वेदपाठक या लेखकाच्या “नामाच्या पाठीमागे” या पुस्तकातील “नामात विलिन कसे व्हावे” या लेखाचे वाचन केले.
- सौ. अमिता सुनिल पाटील यांनी “मराठी भाषा गौरव” दिनानिमित्त शिवाजी पार्क येथे भरवण्यात आलेल्या पुस्तक प्रदर्शनास भेट दिली.

4. **Name of the Staff: Mrs. Dipti Kolte**, Senior Technical Assistant, Dept. of Bacteriology

Sr. No.	Name of Conferences / Seminar / Training / Workshop	Organizer	Location	Date	Duration
1	General Requirements for the Competence of Testing & calibration Laboratories and Internal Audit as per ISO /IEC 17025:2017	HITRT	HITRT	20 th June-23 rd June 2022	9.00 am-5.30 pm
2	VECTOR-2022 ANNUAL ZOONOSIS CONCLAVE Organized On occasion of “World Zoonoses Day”	HITRT, Mumbai	Online	15 th July 2022	10 am-2.0pm
3	Online Lecture Series on Human Rabies Management (World Rabies Day celebration.)	HITRT-NCDC	Online	28.9.2022	9.0 am-5.00 pm
4	मराठी भाषा गौरव दिवस २०२३ Celebration.	मराठी भाषा संवर्धन आयोजन समिती, हाफकिन संस्था	अणुजीवशास्त्र विभाग	27-2-2023	1 Day

Department of Biochemistry

1. Training Programs

Sr. No.	Name of the Staff	Designation	Department	Name of Course Attended	Period
1	Dr. Usha Padmanabhan	Senior Scientific Officer and HOD	Biochemistry	NCDC rabies lecture series	October 2022
2	Dr. AmrutaNaik	S.O.			
3	Mrs. SanikaParkar	S.T.A.			
4	Dr. ShrutiJawale	R.A.			

2. Conferences

Sr. No.	Name of Staff	Designation	Department	Name of Conference Attended	Period	Type of presentation (oral / poster)
1	Dr. Usha Padmanabhan	Senior Scientific Officer and HOD	Biochemistry	National Consultation on developing Action plan for Prevention and Control of Snake bite envenoming India NCDC, New Delhi	26th June 2022	Stakeholders meeting
				4th Edition of the Biopharma Conclave 2022, St Regis, Mumbai	15 -16 Sept 2022	Nil
				Next Generation Therapeutics IITB	18 Nov 2022	Nil
				National Action Plan for Snakebite Envenoming India, NCDC, New Delhi	28th February 2023	Core committee meeting

3. Lectures given by Departmental Staff

Sr. No.	Name of the Staff	Designation	Department	Title of Lecture & Program	Date of Lecture
1	Dr. Usha Padmanabhan	Senior Scientific Officer and HOD	Biochemistry	Demonstrations of ATC for NCDC rabies workshop (6groups)	November 2022
2	Dr. Amruta Naik	S.O.			
3	Mrs. Sanika Parkar	S.T.A.			
4	Dr. Shruti Jawale	R.A.			
5	Dr. Usha Padmanabhan	Senior Scientific Officer and HOD	Biochemistry	Jai Hind College	3rd Feb 2023

Department of Chemotherapy

1. Attended and completed coursework on Research Methodology on Natural Sciences arranged through NPTEL and conducted by IISER Kolkata.
2. Attended a one week workshop on Research methodology arranged by MUHS and conducted at Terna Nursing College, Nerul Mumbai.
3. Attended one day seminar on “Current Trends and Future of ‘3Rs’ in Laboratory Animal Experimentation on the occasion of WORLD LABORATORY ANIMAL DAY organized by Radiation Medical Centre, BARC Mumbai.
4. Lecture series on Human Rabies Management 28th SEPTEMBER 2022, WORLD RABIES DAY CELEBRATIONS Haffkine Institute For Training, Research & Testing MUMBAI Under The National one Health Program for the prevention & Control of Zoonosis, NCDC

Department of Clinical Pathology

Workshop Attended

“Good Clinical Research Practice” workshop organized by Department of Pharmacology & Therapeutics, Seth GS Medical College & KEM Hospital, Mumbai by **Dr. Shashikant P. Vaidya**.

Department of Toxicology

1. Training Programs

Sr. No.	Name of officer	Designation	Topic	Duration
1	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	Attended Four-day training programmed on “General Requirements for the Competence of Testing & Calibration Laboratories and Internal Audit as per ISO / IEC 17025: 2017”. Conducted by IDEMI Organized by Haffkine Institute. In Mumbai	7 th June to 10 th June
	Mrs. Swati Mumbarakar	Sc. Officer (CLII)		20 th June to 23 th June
	Mrs. Meenal Mulkutkar	Sr. Technical assistant		
2	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	Visited Ross Life Science Limited, Pune. For NABL Training	6 th October 2023
	Mrs. Swati Mumbarakar	Sc. Officer (CLII)		
	Mrs. Meenal Mulkutkar	Sr. Technical assistant		
3	Dr. Mrunal Ghag Sawant	Head of Zoonosis department	Visited to National Center for Biological Science (NCBS) at Bangalore	9 th and 10 th February 2023.
4	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	Participation in Innovation Festival In Nehru Science Centre, Worli, Mumbai.	1 st Feb 2023
	Mrs. Meenal Mulkutkar	Sr. Technical assistant		1 st Feb 2023
	Mrs. Swati Mumbarkar	Sc. Officer (CLII)		2 nd Feb 2023
	Mr. Sidhesh Thorat	Junior research fellow		3 rd Feb 2023

Conference

Sr. No.	Name of the Staff	Designation	Topic	Duration
1	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	Attended online lecture c “Recent research and drug delivery” By IBRO global association of Neuroscience society” Organize By ISF college of Pharmacy, Punjab.	13 th , 14 th and 15 th May
	Mrs. Swati Mumbarakar	Sc. Officer (CLII)		
	Mrs. Meenal Mulkutkar	Sr. Technical assistant		
2	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	Attended online preconference and Main conference “Animal Models for One Health Programme: Challenges and Future Perspectives” Organized by LASA , LASCON 2022 at Hyderabad.	2 nd June 3 rd and 5 th June
	Mrs. Swati Mumbarakar	Sc. Officer (CLII)		
3	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	Attend the TIFR Foundation Day Lecture 2022 on "The Infectious Disease Icebag: by Prof. Gagandeep Kang, CMC, Vellore, Homi Bhabha Auditorium, TIFR, Colaba, Mumbai.	24 th June, 2022
	Mrs. Swati Mumbarakar	Sc. Officer (CLII)		
4	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	Attended online: Webinar on world zoonosis day Vector 2022 Organized by Department of zoonosis Haffkine Institute in Mumbai.	10 th July 2022
	Mrs. Swati Mumbarakar	Sc. Officer (CLII)		
	Mrs. Meenal Mulkutkar	Sr. Technical assistant		
	Mr. Siddhesh Thorat	J.R.F		
5	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	Attended online Lecture series attended on Human Rabies Management Funded by NCDC and Organized by Haffkine Institute in Mumbai.	28/09/2022
	Mrs. Swati Mumbarakar	Sc. Officer (CLII)		
	Mrs. Meenal Mulkutkar	Sr. Technical assistant		
	Mr. Siddhesh Thorat	J.R.F		
	Miss Madura Ghatkar	M.Sc. Student		
	Miss Shreya Thakur	M.Sc. Student		

Sr. No.	Name of the Staff	Designation	Topic	Duration
6	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	Webinar: Attended ISO 17025 Introduction and Basic requirements for Testing Laboratories 1. Reproduction and developmental toxicology study in lab animals 2. Bio hazard Biosafety and occupational hazards in laboratory animal facilities. Organized by Animal veterinary college at Parbhani.	16 th January 2023 at 2 to 3 pm
	Mrs. Swati Mumbarakar	Sc. Officer (CLII)		
	Mrs. Meenal Mulkutkar	Sr. Technical assistant		
	Mr. Siddhesh Thorat	J.R.F		
	Miss Madura Ghatkar	M.Sc. Student		
	Miss Shreya Thakur	M.Sc. Student		

2. Lectures Given :

Sr. No	Name of the Staff	Designation	Topic	Duration
1	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	“Zebrafish as an Evolving Model for Research”	7 th June 2022
2	Dr. Mrunal Ghag Sawant	Head of Toxicology Department	Laboratory animal Handling techniques	17 th August 2022
3	Mrs. Swati Mumbarkar	Scientific officer	Importance of zebra fish as evolving research model	8 th June 2022

Department of Virology

1. Hands on Training Given

Mr.Pavankumar Todkar

Sr. No.	Topic	Organizer	Date
1.	Hands on Training on Donning & Doffing of PPE	Under NOHPPCZ-NCDC-HITRT	10-12 Oct 2022 & 29-Nov to 01-Dec
2.	Hands on Training on RNA Extraction		
3.	Hands on Training on Diagnosis of Rabies Virus by RT PCR		

Mrs Manjula Jadhav

Sr. No.	Topic	Organizer	Date
	Hands on Training on Virus Culture	Under NOHPPCZ-NCDC-HITRT	10-12 Oct 2022 & 29-Nov to 01-Dec

Mr Chetan Zope

Sr. No.	Topic	Organizer	Date
1.	Hands on Training on Handling of Brain Samples	Under NOHPPCZ-NCDC-HITRT	10-12 Oct 2022 & 29-Nov to 01-Dec
2.	Hands on Training on RNA Extraction		

4. Lectures Given

Dr. Sandeepan Mukherjee

Sr. No.	Topic	Organizer	Date
1.	Biology of Viruses	ZSCT's Thakur Shyam Narayan Degree College	20/08/2022

5. Training Attended

Sr.No.	Topic	Attended By	Date	Remarks
1	General Requirements For	Dr Sandeepan Mukherjee	June 2022	Training Provided By Institute For Design Of Electrical Measuring Instruments, Ministry Of Micro, Small And Medium Enterprises Msme Technology Centre, Government Of India Society
2	The Competence Of	Mr Pavankumar Todkar	July 2022	
3	Testing &	Mrs Manjula Jadhav	July 2022	
4	Calibration Laboratories And Internal Audit As Per ISO / IEC 17025:2017	Mr Chetan Zope	July 2022	

Department of Zoonosis and Venomous Animal Unit and Experimental Animal Facility

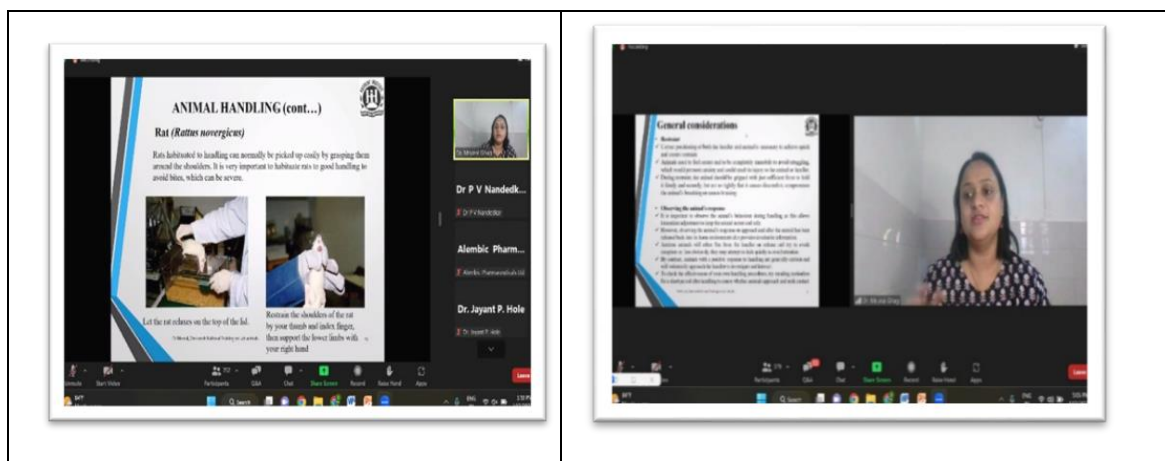
1. Workshop, Conference and Training Programs:

Sr. No.	Name of the Staff	Designation	Topic	Duration
1	Dr. Mrunal Ghag Sawant	Head of Zoonosis Department	Attended online lecture “Recent research and drug delivery By IBRO global association of Neuroscience society’s college of Pharmacy.	13,14 and 15 May 2021
2	Dr. Mrunal Ghag Sawant	Head of Zoonosis Department	Attended online preconference and Main conference in “Animal Models for One Health Programme: Challenges and Future Perspectives”	2 June -5 June 2022
3	Dr. Mrunal Ghag Sawant	Head of Zoonosis Department	Attended Four day training programmed on “General Requirements for the Competence of Testing & Calibration Laboratories and Internal Audit as per ISO/IEC 17025:2017”.	7 th June to 10 th June 2022
	Mrs. Trupti Satvekar	Scientific Officer (Class II)		20 th June to 23 rd June 2022
	Mr. Pradeep Jadhav	Sr.Technical assistant		7 th June to 10 th June 2022
	Mr.Sanjay Mane	Sr.Technical assistant		20 th June to 23 rd June 2022
4	Dr. Mrunal Ghag Sawant	Head of Zoonosis department	Attended the TIFR foundation Day Lecture 2022 on “The infectious Diseases Iceberg: by Prof. Gaga deep Kang,CMC,Vellore,Homi Bhabha Auditorium,TIFR,Colaba,Mumbai	24 th June,2022
	Mrs. Trupti Satvekar	Scientific Officer (Class II)		
5	Dr. Mrunal Ghag Sawant	Head of Zoonosis department	Attended Group Meeting All India Network Project on Vertebrate Pest Management, Jodhpur	28 July-29 July 2022

Sr. No.	Name of the Staff	Designation	Topic	Duration
6	Dr. Mrunal Ghag Sawant	Head of Zoonosis department	Attended Symposium on “Advances in the Natural Products Research for the Treatment of Infectious Diseases and Metabolic Disorders” Organized by National Institute of Pharmaceutical Education and Research (NIPER) Hyderabad.	18 th to 19 th November 2022.
	Mr.Pradeep Jadhav	Sr.Technical assistant		
	Ms. Sheetal Shetty	M.Sc.Student		
7	Dr. Mrunal Ghag Sawant	Head of Zoonosis department		28 th September 2022
	Mrs. Trupti Satvekar	Scientific Officer (ClassII)	Attended online lecture series on Human Rabies Management	
	Mr.Pradeep Jadhav	Sr.Technical Assistant		
	Ms. Sheetal Shetty	M.Sc. Student		
8	Dr. Mrunal Ghag Sawant	Head of Zoonosis department	Visited Ross Life science Limited, Pune.	6 th October 2022
	Mrs. Trupti Satvekar	Scientific Officer (Class II)	For NABL Training	
	Mr.Pradeep Jadhav	Sr.Technical assistant		
	Mr.Sanjay Mane	Sr.Technical assistant		
9	Dr. Mrunal Ghag Sawant	Head of Zoonosis department	Participated in Innovation Festival in Nehru Science Centre, Worli, Mumbai.	1 st Feb -3 rd February , 2023
	Mrs. Trupti Satvekar	Scientific Officer (Class II)		
	Mr.Pradeep Jadhav	Sr.Technical assistant		
	Mr.Sanjay Mane	Sr.Technical assistant		
	Mr. Ashirwad Raorane	Snake Man		
	Mr. Rohan Nimbalkar	Snake Man		
10	Dr. Mrunal Ghag Sawant	Head of Zoonosis department	Visited to National Center for Biological Sciences (NCBS) and Indian Institute of Science (IISc) at Bangalore ,visit organized by Haffkine Institute, Mumbai	9 th and 10 th February,2023

2. Guest Lectures

1. Dr. Mrunal Ghag-Sawant was invited as guest speaker to deliver lecture series in 10th day Online Lecture National Training program in “Laboratory Animal in Biochemical Research” At Animal veterinary college at Parabhani during 12th January 2023 at 3.30 to 4.30 pm.



2. Dr. Mrunal Ghag-Sawant was invited as guest speaker to deliver lecture in Regional Research Institute of Unani Medicine as a expert panelist for one day National Seminar on 6th February 2023.



Staff
and
Students

Director: Mrs. Seema Vyas, IAS
(Addl. Charge)
as on 31st March 2023

Director's Office

Sr. No.	Name of staff	Designation
1	Smt. Supriya P. Gulekar	Stenographer

Administration

Sr. No.	Name of staff	Designation
1	Dr. Usha Padmanabhan	Chief Administrative Officer, Addl. Charge (01/04/2022 to 21/02/2023)
	Shri. Sharad Makane	Chief Administrative Officer, Addl. Charge (22/02/2023 to 31/03/2023)
2	Smt. Hemangee N. Khanolkar	Statistician (01/04/2022 to 20/02/2023)
3	Shri. Anant M. Kandalgaonkar	Assistant Superintendent
4	Shri. Mahendra S. Bhurkunde	Senior Clerk
5	Smt. Vaidehi P. Vanjare	Clerk
6	Smt. Sonali J. Kale	Clerk
7	Smt. Ruchira R. Chavan	Telephone Operator (Retired on 28 th Feb, 2023)
8	Shri. Navnath M. Ghode	Driver
9	Shri. Mandar Y. Shinde	Driver
10	Shri. Shishupal G. Kamble	Laboratory Attendant
11	Smt. Seema B. Borate	Laboratory Attendant
12	Shri. Hemant S. Salvi	Peon
13	Shri. Suresh D. Madgude	Peon
14	Shri. Paresh S. Ghosalkar	Servant
15	Shri. Sanjay S. Surve	Mukadam
16	Shri. Nanjibhai M. Baria	Sweeper
17	Shri. Hemant Shinde	Sweeper
18	Shri. Santosh R. Gurav	Sweeper
19	Smt. Trupti R. Ghadi	Sweeper
20	Shri. Anil W. Bukane	Sweeper
21	Shri. Swapnil S. Kasale	Sweeper

Sr. No.	Name of staff	Designation
22	Shri. Amol Gaikwad	Sweeper
23	Shri. Akash S. Gorla	Sweeper
24	Miss. Vandana Mane	Mali
25	Shri. Prakash Kalsulkar	Mali
26	Shri. Baburao Khotare	Mali
27	Shri. Raju Gaikwad	Mali
28	Shri. Laxmikant Avale	Mali
29	Shri. Anil Somshetty	Mali cum watchman
30	Shri. Shrikant Mohite	Mali cum Shetrapal

Accounts

Sr. No.	Name of staff	Designation
1	Shri. Shantaram Barkade	Accounts Officer (16/06/2022 to 31/03/2023)
2	Smt. Priyanka Ghag	Assistant Accounts Officer (Addl Charge as Accounts Officer from 01/04/2022 to 15/06/2022)
3	Ms. Vaishali V. More	Assistant Superintendent
4	Smt. Pramila K. Tambe	Clerk
5	Shri. Sandeep I. Ingavale	Clerk
6	Shri. Mahmad Fakir Kasim	Laboratory Attendant
7	Shri. Rohan Mhatre	Laboratory Attendant
8	Shri. Sachin U. Somshetti	Peon

Stores

Sr. No.	Name of staff	Designation
1	Shri. Tushar Borse	Assistant Librarian Store, Addl. Charge (22/09/2022 to 21/02/2023)
	Shri. Nilesh Gaikwad	Medical Social Worker Store, Addl. Charge (01/03/2023 to 31/03/2023)
2	Smt. Anita V. Raut	Clerk
3	Shri. Santosh M. Mungekar	Clerk
4	Shri. Raju A. Mavlankar	Laboratory Attendant
5	Shri. Madhukar S. Shengal	Laboratory Attendant

Training

Sr. No.	Name of staff	Designation
1	Dr. Vrushali Patil	Scientific Officer, In-Charge of Training Department
2	Shri. Nilesh Gaikwad	Medical Social Worker (01/04/2022 to 28/02/2023)
3	Shri. Rohidas M. Kahandole	Servant

Department of Bacteriology

Sr. No.	Name of staff	Designation
1	Dr. Anuya A. Rege	Sr. Scientific Officer & Head
2	Smt. Amita S. Patil	Scientific Officer
3	Smt. Jayashree A. More	Scientific Officer
4	Smt. Dipti B. Kolte	Senior Technical Assistant
5	Shri. Jitendra S. Dalvi	Laboratory Assistant (01/04/2022 to 31/05/2022)
6	Shri. Ravindra T. Bire	Laboratory Assistant
7	Shri. Sandip V. Kegde	Laboratory Attendant

Department of Biochemistry

Sr. No.	Name of staff	Designation
1	Dr. Usha Padmanabhan	Senior Scientific Officer & Head
2	Dr. Amruta Naik	Scientific Officer
3	Smt. Sanika Parkar	Senior Technical Assistant
4	Shri. Sameer Patil	Senior Technical Assistant
5	Shri. Pravin Shirsat	Laboratory Assistant
6	Shri. Samrat More	Laboratory Attendant
7	Miss. Priyanka Mishra	Ph. D. Student
8	Dr. Shruti Jawale	RA (04/07/2022 to 28/02/2023)

Department of Cell Biology

Sr. No.	Name of staff	Designation
1	Dr. Usha Padmanabhan	Senior Scientific Officer & Head
2	Shri. Bhagyavan Pawar	Laboratory Assistant
3	Shri. Shashank Sarang	Laboratory Assistant
4	Dr. Priyanka Gupta	Research Associate (Ph.D. AIIMS, New Delhi)
5	Ms. Bhupali Kore	Ph.D. Student (Applied Biology Joined in Feb 2023)
6	Shri. Pavankumar Todkar	Ph.D. Student (Applied Biology Joined in Feb 2023)

Chemical Testing Unit

Sr. No.	Name of staff	Designation
1	Smt. Suvarna Pachpore	Senior Scientific Officer & Head
2	Shri. Manoj Patil	Scientific Officer
3	Shri. Santosh Bagal	Scientific Officer
4	Smt. Hemangee N. Khanolkar	Statistician (21/02/2023 to 31/03/2023)
5	Smt. Shweta Dalvi	Senior Technical Assistant
6	Smt. Prachi Ghadage	Senior Technical Assistant
7	Smt. Deepali Kambli	Senior Technical Assistant
8	Shri. Subhash Kulal	Senior Technical Assistant
9	Shri. Praveen Thakur	Laboratory Assistant
10	Shri. Ravindra Katkar	Laboratory Assistant
11	Shri. Dilip S. Pawar	Laboratory Assistant
12	Smt. Bhargavi Sawant	Laboratory Assistant
13	Shri. Anil Rawale	Laboratory Attendant
14	Shri. Sandesh Kadam	Laboratory Attendant
15	Shri. Nikhil Bhendkar	Laboratory Attendant

Department of Chemotherapy

Sr. No.	Name of staff	Designation
1	Dr. Ashish L Asrondkar,	Scientific Officer & Head
2	Dr. Vrushali N Patil,	Scientific Officer
3	Shri. Sushant R Kaple,	Scientific Officer
4	Smt. Swati Sanap	Senior Technical Assistant (06/06/2022 to 31/03/2023)
5	Shri. Jitendra S. Dalvi	Laboratory Assistant (01/06/2022 to 31/03/2023)
6	Shri. Rohan A Patil	Laboratory Attendant
7	Shri. Maruti V Chile	Laboratory Attendant

Department of Clinical Pathology

Sr. No.	Name of staff	Designation
1	Dr. Shashikant P.Vaidya	Assistant Director & Head (Retired on 31 st Jan 2023)
2	Dr. Sandesha N. Pashte	Medical Officer (Addl. Charge of HOD 01/02/2023 – 31/03/2023)
3	Smt. Vibhuti A. Thakur	Scientific Officer
4	Smt. Swati Sanap	Senior Technical Assistant (01/04/2022 to 05/06/2022)
5	Shri. Ravikant Khochare	Laboratory Assistant
6	Shri. Avinash More	Laboratory Attendant
7	Ms. Durga Bethala	Ph. D. Research Fellow, University of Mumbai
8	Ms. Pinky Singh	Ph. D. Research Fellow, University of Mumbai

Department of Toxicology

Sr. No.	Name of staff	Designation
1	Dr. Mrunal Ghag Sawant	Scientific Officer & Head
2	Smt. Swati Mumbarakar	Scientific Officer
3	Smt. Meenal Mulkutkar	Senior Technical Assistant
4	Shri. Mahesh Gaonkar	Laboratory Attendant

Department of Virology

Sr. No.	Name of staff	Designation
1	Dr. Sandeepan Mukherjee	Scientific Officer & Head
2	Shri. Pavankumar. Todkar	Scientific Officer
3	Smt. Manjula Jadhav	Senior Technical Assistant
4	Shri. Chetan Zope	Senior Technical Assistant
5	Smt. Monica Bhurkunde	Laboratory Assistant
6	Smt. Rajashree Patil	Laboratory Attendant
7	Shri. Amol Rane	Laboratory Attendant
8	Shri. Santosh Gujar	Laboratory Attendant

Department of Zoonosis and Venomous Animal Unit and Experimental Animal Facility

Sr. No.	Name of staff	Designation
1	Dr. Mrunal Ghag Sawant	Scientific Officer & Head
2	Shri. Trupti Satvekar	Scientific Officer
3	Shri. Pradeep Jadhav	Senior Technical Assistant
4	Shri. Sanjay Mane	Senior Technical Assistant
5	Smt. Jyostna Naik	Laboratory Assistant
6	Shri. Aashirwad Raorane	Snake Man
7	Shri. Rohan Nimbalkar	Snake Man
8	Shri. Vagesh Walhekar	Assistant Snake man
9	Shri. Kailas Aaglave	Insect Collector
10	Shri. Pankaj Javir	Laboratory Attendant
11	Shri. Siddhesh Thool	Laboratory Attendant
12	Smt. Yugantika Mokashi	Laboratory Attendant
13	Shri. Pankaj Javir	Laboratory Attendant
14	Shri. Vikrant Ghadi	Animal Attendant
15	Ku. Swapnali S. Kadam	Peon
16	Ms. Sanjana Rampurkar	1 year recruitment from NATS

Dispensary

Sr. No.	Name of staff	Designation
1	Dr. Shashikant P.Vaidya	Assistant Director & Head (Retired on 31 st Jan 2023)
2	Dr. Sandesha N. Pashte	Medical Officer (Addl. Charge of HOD 01/02/2023 to 31/03/2023)
3	Dr. Shital U. Mane	Medical Officer
4	Smt. Rupali K. Ghugare	Nurse
5	Shri. Sunil B. Khaire	Laboratory Attendant

Library

Sr. No.	Name of staff	Designation
1	Smt. Sarita Wadekar	Librarian
2	Shri. Tushar Borse	Assistant Librarian
3	Shri. Pramod Andhere	Laboratory Assistant
4	Shri. Abhishekh Manjarekar	Laboratory Attendant

