ADVANCED CENTRE FOR TREATMENT, RESEARCH & EDUCATION IN CANCER (ACTREC)



Annual Report 2022

ADVANCED CENTRE FOR TREATMENT, RESEARCH & EDUCATION IN CANCER

NAVI MUMBAI



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Director- ACTREC, Tata Memorial Centre
Message for Annual Report 2022



Great institutions are inspiring, resilient, and resolute in their pursuit of the extraordinary. The Advanced Centre for Treatment, Research, and Education in Cancer (ACTREC), as an integral part of the Tata Memorial Centre (TMC), exemplifies this ethos. It embodies a profound commitment to advancing cancer care, driven by a relentless quest for excellence in service, education, and research.

This year, ACTREC has taken significant strides, reinforcing its position as a leader of innovation and care. The expansion of its clinical services has been a hallmark achievement. From a modest 100 beds in 2020 to a robust 500-bed facility today, ACTREC is poised to further scale to 900 beds by the end of 2025. This growth symbolizes more than infrastructure—it represents hope for countless patients and their families.

Our state-of-the-art surgical facilities, including 13 new operating theatres and a dedicated robotic surgery unit, reflect our resolve to integrate cutting-edge technology into patient care. Within a short span, ACTREC has emerged as a leader in robotic-assisted cancer surgeries, setting benchmarks not only within the public sector but across India.

Research remains the lifeblood of ACTREC. The contributions of our scientific community highlight the depth of our academic endeavours. Through programs like Ph.D. JRF admissions, ACTREC continues to nurture a new generation of researchers, ensuring the legacy of innovation endures.

Our efforts in education and training have not only created a pool of skilled professionals but have also transformed cancer care delivery in India. As we navigate the complexities of cancer care, the rising cancer burden in India presents an ever-growing challenge. With over two million new cases projected annually by 2035, ACTREC - and TMC - are committed to leading the transformation of cancer care through the hub-and-spoke model. This approach ensures equitable access to high-quality cancer care, even in the most underserved regions of our nation.

ACTREC's journey is one of passion, dedication, and an unyielding commitment to its mission. It stands as a testimony to what is achievable through vision, teamwork, and perseverance. Yet, we remain humbled by the trust placed in us by patients, families, and society. This trust propels us to strive tirelessly towards a future where cancer no longer means a life interrupted.

On behalf of the Tata Memorial Centre family, I extend my deepest gratitude to all those who contribute to our mission.

Dr. Sudeep Gupta,

MD, DM

Director, ACTREC, Tata Memorial Centre

Message from the Director, Centre for Cancer Epidemiology



As the Director of the Centre for Cancer Epidemiology (CCE), it gives me immense pride to present the Annual Report of CCE for the year 2022. This year has been one of significant progress, dedicated research, and impactful collaborations as we continue our mission to advance understanding and control of cancer through epidemiological studies.

Despite the challenges brought forth by a rapidly evolving healthcare landscape, our esteemed team has remained steadfast in its commitment to excellence. We have successfully initiated new research projects, published ground breaking findings, and strengthened our partnerships with leading institutions, both nationally and internationally.

In 2022, our focus on leveraging cutting-edge technology and interdisciplinary approaches has allowed us to explore novel risk factors, enhance early detection methodologies, and contribute valuable data towards cancer prevention strategies. These achievements are a testament to the unwavering dedication of our researchers, clinicians, and staff.

Furthermore, our efforts in capacity building and knowledge dissemination have enabled us to reach broader audiences and empower communities with the tools to mitigate cancer risks. I am particularly proud of the strides we have made in integrating patient-centric approaches, which have ensured that our research remains both impactful and relevant to real-world needs.

As we move forward, I extend my heartfelt gratitude to our collaborators, funding agencies, and supporters who have played a vital role in our success. Together, we will continue to push boundaries, transform lives, and work towards a future free from the burden of cancer globally.

Let us move ahead with renewed energy and determination as we pave the way for transformative discoveries and meaningful change.

With sincere appreciation,

Dr. Rajesh Dikshit

Director, Centre for Cancer Epidemiology

Message from Dr. Pankaj Chaturvedi
Head and Neck Surgeon & Deputy Director,
Centre for Cancer Epidemiology
Kharghar, Navi Mumbai



As we reflect on the accomplishments of the year 2022, it is with great pride that I present the progress and milestones achieved at the Centre for Cancer Epidemiology (CCE). Our mission to advance the understanding, prevention, and treatment of cancer has guided every endeavor, and the collective efforts of our team have brought us closer to our vision of reducing the cancer burden in our community and beyond.

This year has been transformative, marked by significant strides in research, innovation, and community outreach. Our epidemiological studies have provided critical insights into the risk factors, prevalence, and patterns of cancer in diverse populations. These findings have not only informed public health strategies but also enabled the development of targeted interventions aimed at early detection and prevention.

Collaboration has been the cornerstone of our success. Partnering with leading institutions, healthcare professionals, and policymakers, we have amplified our impact and ensured that our research translates into actionable solutions. Furthermore, our commitment to capacity building has been unwavering, with training programs and workshops empowering the next generation of researchers and clinicians.

As a Head and Neck surgeon, I am particularly encouraged by the advancements in minimally invasive surgical techniques and personalized treatment protocols that we have implemented. These innovations are improving patient outcomes and quality of life, which remains at the heart of our efforts.

I extend my heartfelt gratitude to our dedicated team, stakeholders, and supporters whose contributions have been invaluable. Together, we are making meaningful progress against cancer, and I am confident that the coming years will see even greater achievements.

Let us continue this journey with renewed determination and hope.

Warm regards,

Dr. Pankaj Chaturvedi

Message from Dr. Prasanna Venkatrman Principal Investigator and Deputy Director, CRI, ACTREC



Dear Colleagues,

The year 2022 has been special for many reasons. It marks two decades since our centre moved to this new campus, a journey that has seen tremendous growth in our capabilities and facilities. Despite the challenges brought by the Covid-19 pandemic, we have emerged stronger, expanding our reach and broadening our impact in the field of cancer research.

As we reflect on this progress, I am reminded of the words of Marie Curie: "One never notices what has been done; one can only see what remains to be done." This perspective resonates deeply with our ethos. While we are proud of our achievements, we recognize that much remains to be accomplished in the fight against cancer.

The year 2022 has been a pivotal year for the Cancer Research Institute (CRI) at ACTREC. Our dedication in cancer biology has led to several remarkable milestones and success stories. The synergy between basic research and clinical science has resulted in innovative solutions that directly impact patient care. Our research portfolio has been enriched by numerous accolades, and our young innovators have been recognized at both national and international forums.

This year, we have placed a strong emphasis on collaboration, adaptability, and interdisciplinary partnerships. From ground breaking advancements in immunotherapy to the discovery of novel biomarkers, our teams have worked tirelessly to translate research into tangible clinical outcomes.

I want to extend my deepest gratitude to our researchers, clinicians, staff, and collaborators whose tireless efforts have propelled us to these successes. Your commitment and passion continue to be the cornerstone of CRI's achievements. I also wish to thank our funding agencies, donors, and stakeholders for their unwavering support.

Looking ahead, we remain committed to pushing the boundaries of cancer research. By continuing to harness cutting-edge technologies like genomics, proteomics, and artificial intelligence, we aim to

accelerate the pace of discovery and deliver solutions that benefit patients directly.

Together, we will continue to make significant strides in the fight against cancer, and I am confident that our collective efforts will pave the way for a future where cancer is no longer a life sentence.

With best wishes,

Dr. Prasanna Venkatraman

Deputy Director, CRI ACTREC

Message from Dr. Navin Khattry, Deputy Director, Clinical Research Centre, TMC - ACTREC



The Annual Report 2022 reflects a year of perseverance, innovation, and significant achievements at the Clinical Research Centre, TMC-ACTREC. As we navigate an era marked by rapid advancements in cancer research, our commitment to excellence remains steadfast. This year, we have not only strengthened our focus on conducting impactful clinical trials but also worked towards bridging the gap between bench research and bedside care.

Our researchers and clinicians have collaborated to explore innovative therapies, ranging from targeted treatments to immunotherapy, ensuring that our patients benefit from the latest advancements. These efforts have translated into tangible outcomes, with several trials yielding promising results. Moreover, we have prioritized the inclusion of diverse patient populations, thereby ensuring that our research findings are globally relevant and applicable.

The year 2022 has also been significant for fostering partnerships. Collaborations with national and international research institutions have enriched our understanding of cancer biology and facilitated the development of novel therapeutic strategies. These alliances underscore the importance of collective expertise in tackling the complexities of cancer.

At the heart of our achievements lies the unwavering dedication of our multidisciplinary teams—scientists, clinicians, nurses, and support staff—who have worked tirelessly to ensure the success of our research initiatives. Their relentless pursuit of knowledge and innovation drives us toward achieving our vision of transforming cancer care.

As we look ahead, the Clinical Research Centre is poised to embrace emerging technologies and methodologies, including artificial intelligence, precision medicine, and next-generation sequencing. These advancements promise to deepen our understanding of cancer biology, enhance diagnostic accuracy, and personalize treatment approaches.

In closing, I extend my gratitude to the patients who entrust us with their care and to our collaborators, funders, and stakeholders who

believe in our mission. Together, we will continue to advance the science of oncology and improve the lives of those affected by cancer.

"Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world." – Louis Pasteur

Dr. Navin Khattry

Deputy Director

Clinical Research Centre, TMC-ACTREC

Overview of ACTREC

The **Advanced Centre for Treatment, Research and Education in Cancer** (ACTREC) of the Tata Memorial Centre in Kharghar, Navi Mumbai comprises of (1) the Clinical Research Centre and a 120+ -bed Hospital that together address clinical and translational cancer research and treatment of cancer patients, (2) the Cancer Research Institute that focuses on basic and applied research on cancer, and (3) the Centre for Cancer Epidemiology. Clinicians and scientists of the Centre are committed to numerous basic, applied, translational and clinical research projects that strive for a comprehensive understanding of cancer and attempts to achieve early diagnosis and improved survival of cancer patients. Most of these interdisciplinary projects involve collaborations both within the Centre and also with national/ international centres of repute from academia and industry, and are supported by institutional, intramural or extramural funding. During **2022,** there were **233** on-going projects at ACTREC- **56** of these projects received financial support of **Rs 5.46 crores** from governmental agencies such as DBT, DST, ICMR, etc.; **21** of these were institutional intramural projects which received **Rs 1.85 crores**. In addition, **14** projects were funded by Pharmaceutical companies and sanctioned **Rs. 0.1819 crores** and all of it has been received for the calendar year. Research carried out by faculty of the Centre resulted in **311** total publications in the year 2022, of which **231** were in reputed international journals, **50** in widely circulated Indian journals, **28** were book chapters, **2** books and **1** patent. Besides these in 2022, scientists, clinicians and students, a total of **36** received accolades and awards for their research contribution. During 2022, **131** regular staff members were appointed in different grades in Medical, Scientific, Technical and Administrative cadres, adhering to the reservation policies of the Government of India, besides staff were appointed on-contract under Technical, Non-Technical & Nursing Category to manage the work load due to inflow of cancer patients at the Centre. Presently over a **1000** members are working under an outsourced contractor at ACTREC.

Several important TMC projects located in the ACTREC campus made good progress during 2022. In February, the foundation brick-laying ceremony of Shanghvi Block (Shantilal Shanghvi Pediatric Hematolymphoid Cancer Centre), a project generously sponsored by the Shantilal Shanghvi Foundation, was held at ACTREC. The indigenously built FDM 3D Printer was inaugurated by Dr. R. A. Badwe, Director, TMC, and Dr. Sudeep Gupta, Director, ACTREC, on

5th April 2022.The Raja S. Rao Shodhika was inaugurated comprising of an Operation Theatre Complex, ICU complex & Post-Operative Recovery and a Day-Care Ward. Besides this New Modular Operation Theatres located in the Raja Rao Shodhika were inaugurated in September.

Clinical Research Centre

The Clinical Research Centre (CRC) and Hospital are spearheading new expansions at ACTREC. CRC has a total of 101 beds which include 13 ICU & recovery and 6 Bone marrow transplant beds. The Solid tumor block was commissioned in 2022 with total 270 beds that include 40 ICU and recovery beds, 72 daycare beds, 6 casualty beds and 4 BMT beds. In 2022, ACTREC treated a total of 112 COVID cases, which also included staff members. Covishield as well as Covaxin vaccines, were provided as per the availability with Panvel Municipal Corporation to patients, patient caregivers, staff and their dependents, students, senior citizens, and also to residents in the vicinity of ACTREC. In 2022, the Centre provided 19378 COVID vaccination doses.

ACTREC has seen a significant and steady increase in patient registration in 2022. Total new registrations in 2022 were 2818 in ACTREC, 21066 transfer cases from TMH, and 2657 referrals for diagnostic and 371 expert opinion requirements. Daycare services were used by 560 new patients. RT new referrals were a total of 1956, and 1860 patients have undergone Interventional Radiology procedures. In 2022 surgeries carried out were 2890 (major) and 582 (minor) in 14 Operation theatres. New advanced diagnostic tests have been introduced at ACTREC, viz. 1 test in Microbiology, 13 FISH tests in Cancer Cytogenetics, 5 tests under Transplant Immunology and Immunogenetics laboratories, and 1 test under Transfusion medicine.

The patient care projects at ACTREC were deferred due to the COVID crisis. The year 2022 has successively completed the layover of the Covid pandemic years and was progressive in leaps and bounds. An inauguration of the Maruti Eco Food Van was undertaken at ACTREC on 24th March 2022 by Shri. Jagdish N. Vora, who generously donated the Food Van in coordination with V Care Foundation. The ACTREC Diagnostic Laboratories appeared for NABL Re-assessment and were granted continued accreditation with validity until 19th May 2024. On 28th May 2022, an inauguration ceremony for Chemotherapy Units was undertaken at RRS. The Chemotherapy Units have been generously donated by the Rotary Club of Mumbai Royals.

On 28th June 2022, an inauguration ceremony of the Pulmonary Function Test Unit was undertaken at RRS. The unit was a generous donation by the Rotary Club of Bombay Mid-City. A Patients' Electronic Medical Records (EMR) App was launched in ACTREC-TMC on 1st July 2022 by Dr. R.A. Badwe, Director TMC, developed by the ACTREC IT team. CPR Training Session for Non-Medical Staff was conducted on the 25th August, 2022. The App will facilitate quick access to patient-centric services. ACTREC observed National Nutrition week and Poshan Maah on 16th September 2022. The inauguration of Agilent Tape Station 420, a CSR initiative by TATA BlueScope Steel, was conducted at CCE on 21st September 2022. New Modular Operation Theatres donated by Power Grid were inaugurated at RRS building on 23rd September 2022 by Dr. Rajendra Badwe, Director, TMC. World Breast Cancer Awareness Program was celebrated on 12th October 2022, organized by Gunvati Jagannath Kapoor (GJK) Foundation in support with ACTREC, D.Y. Patil School of Hospitality & Tourism Studies, and Shankar Mahadevan Academy - Nirvana. An inauguration ceremony of TATA Intra V30 on 19th December 2022 generously donated by V Care Foundation for on-campus material transportation.

The **Clinical Research Centre** and **Hospital** constitutes; the Department of **Medical Oncology** which administers chemotherapy in the neoadjuvant, adjuvant and palliative setting for solid tumors. It comprises of the adult solid tumor unit, the bone marrow transplant unit and the pediatric oncology unit. The Department conducts various trials with extramural and intramural funds.The **Department of Radiation Oncology** provides high quality radiotherapy services With the on-going expansion of clinical (surgical and medical oncology) services at ACTREC, radiotherapy services needs to keep pace, as nearly 70% of all patients will require this modality. The **Surgical Oncology Department** at ACTREC provides continued care to a wide range of cancer patients, and includes in-patient care as well as outpatient clinics. The service conducts five regular operating theatres five days a week and two operating theatres during Saturdays. The department also maintains regular OPDs (newly registered as well as pre- and postoperative care follow-up OPDs) for breast, head and neck and neurosurgery. The Department of **Anesthesiology, Critical Care and Pain** provides: Anesthesia services for 5 Major OT, Interventional Radiology, MRI, Radiotherapy OT and Endoscopy; Critical Care for a 10-bedded ICU (3 isolation beds) plus a 3-bedded PACU with a CPR team; renders Acute Pain services and care in the COVID ICU. The **Radiodiagnosis and Interventional Radiology**

Department provides a wide spectrum of diagnostic imaging services including conventional radiology, ultrasonography including color Doppler, digital mammography, fusion positron emission, computed tomography (PET-CT), magnetic resonance imaging, as well as interventional radiology procedures during working hours, and extends emergency radiological services 24x7 for patients and clinical services at ACTREC. The **Department of Transfusion Medicine** provides safe and adequate supply of blood components round the clock to meet the needs of patients admitted at ACTREC. During the period from January to December 2022, a total number of; 3483 blood units were collected, 1252 plateletpheresis performed, 7158 blood components prepared, and 5563 blood components were issued. In addition, 80 specialized procedures (which included 61 Peripheral Stem Cell Harvest, 11 Granulocytapheresis, 4 lymphocytapheresis and 4 advanced graft CD45RA+ manipulation procedures) were performed. Under specialized blood components, 857 units were leuco-depleted and 2144 gamma-irradiated. Blood grouping and cross-matching was done on 20,033 and 10,643 number of blood samples respectively. The department organized 54 outdoor blood donation camps. The department participates routinely in EQAS (External Quality Assurance Scheme) program conducted by the Indian Red Cross Society EQAS. The **Nursing Department** strives to provide a safe environment and positive experience to patients/caregivers. In 2022, it initiated its journey towards Nursing Excellence Certification, efforts and attention were focused on expansion activities for the newly commissioned Raja Rao Shodhika Block, the new joiners' underwent a week's induction program, various Audits were undertaken to ensure quality care and compliance to protocols, nurse led CVAD and Stoma clinics provided focused care to patients. The feedback on, 'Overall Satisfaction with Nursing Care' yielded a response as, 'very well and above' from 92% of patients. Jubilant moments for the Department were the selection of Mr. Amish Kale for the "Rising Star Award" by Global Power of Oncology Nursing (GPON), and nurses who won awards for competitions held at ACTREC. The **Cancer Cytogenetics** department received diagnostic samples (3698), for cytogenetic and molecular cytogenetic testing (7125). Tests (24,152) including comprehensive FISH panels for hematolymphoid malignancies, chimerism studies in sex mismatch post-BMT patients; karyotyping, chromosomal breakage studies and ploidy assessment were performed. The External Quality Assessment Scheme (EQAS) in Cytogenetics (FISH and conventional karyotyping) for proficiency testing with 7 premier cytogenetic laboratories in the country and

recruitment of de-novo B-ALL patients for ICMR extramural ad-hoc cytogenetic and molecular study was achieved in the report year. Funding from ICMR-DHR was received for the 3rd Annual Cytogenetics Workshop conducted from 17-19 November, 2022. **Surgical Pathology** laboratory at ACTREC is a part of the Department of Pathology, TMC, and all the pathology consultants and resident doctors work on rotation at TMH as well as ACTREC. At any given time, the ACTREC laboratory has one pathology consultant and four residents (senior residents and junior residents; all by rotation). The **Hematopathology Laboratory** is a service laboratory at ACTREC and undertakes the diagnosis and sub classification of hematological malignancies as well as, monitoring of patients while on therapy, for all malignancies. The laboratory uses morphology, flow cytometry and molecular techniques for diagnosis. The laboratory does minimal residual disease testing and post treatment monitoring of patients with Chronic Myeloid Leukemia, B cell Acute Lymphoblastic leukemia in children, T cell Acute Lymphoblastic Leukemia, Acute Myeloid leukemia and Multiple Myeloma. These tests are used to tailor the treatment for individual patient based on response to initial treatment. The **Microbiology Laboratory** provides cancer patient related diagnostic services which encompass bacteriology, serology, clinical microbiology, mycology, mycobacteriology, molecular microbiology and hospital services for sterility testing. The staff is actively associated with 3 IEC approved research projects and have authored/co-authored 5 national/international publications in the report year. The newly introduced Syndromic Multiplex PCR for infectious diseases has enhanced early detection of infections and antibiotic resistance markers in patients, particularly in Medical Oncology and Bone Marrow Transplant recipients, leading to earlier diagnosis and facilitating treatment. Members of the Laboratory are actively involved in academic activities and in the year 2022 have presented/ participated in several conferences/workshops. The **Composite Laboratory** is NABL accredited, provides round-the-clock service to the hospital and has four sections comprising of sample collection area, hematology, biochemistry and cytology. The laboratory provides patient related and hospital services of routine hematology, biochemistry (routine biochemistry and immunoassay). During the period January to December 2022,the laboratory performed 6,46,344 tests for routine biochemistry, 11,465 immunoassays, 50,610 biochemistry tests for research projects; 79,318 tests for routine haematology and 1,375 haematology tests as research projects, murine and canine blood samples are processed for research purpose. The laboratory

conducts a 1-year advanced training course in Medical Laboratory Technology since November 2015 and routine training for science and DMLT students. Students of the 2021 batch have completed their training in August 2022, and are currently serving their 'bond period'. The **Translational Research Laboratory** has its primary focus on the role of cell-free chromatin particles in ageing, degenerative disorders and cancer. The **Clinical Pharmacology Laboratory** aims at developing new drugs for graft versus host disease (GVHD), acute lymphoblastic leukemia (ALL) and radioprotection. In addition, critical support and expertise necessary to conduct early-phase clinical trials in oncology and also training personnel and developing capacity in the field of cancer pharmacology, biostatistics and clinical research operations is provided by the faculty. This laboratory is identified as an adverse drug reaction monitoring centre under the pharmacovigilance program of India for capturing and reporting adverse events due to drugs and devices occurring at TMC, and also the ICMR Centre for Advanced Research and Excellence in Clinical Pharmacology (ICMR-CARE). The **Clinical Scientists Laboratory** endeavours range from basic to translational research with the primary objective of identifying fundamental biological processes in tumorigenesis of breast cancer, with emphasis on hypoxia, Epithelial-to-Mesenchymal Transition (EMT), stemness and tumour dormancy. The laboratory also works in the field of lung and head & neck cancers to unravel complexities at the gene level and to translate preclinical outcomes into relevant interventions for clinical issues. Further non-invasive, NGS-based assays to decipher the genomic landscape of breast cancer patients as surrogate markers of tumour burden and progression are being developed. This laboratory's NGS facility has provided sequencing facility to over 500 patients and the Tape Station has been extensively used as part of quality control for both, diagnostic tests and research purposes.

Cancer Research Institute

The programs of the Cancer Research Institute's Principal Investigator led laboratories continued during 2022, with the on-going projects steadily progressing towards fulfilling their aims and new projects initiated in the area of basic and applied research on cancer. Several accolades were won by the scientists and students of the Cancer Research Institute during the year 2022. **Dr Amit Dutt** was featured by DST- 2022, among the top 75 scientists of India, across all disciplines, shaping the future of the country; **Dr. Sanjay Gupta** was selected as a Core Member of the Screening Committee of Life Sciences for SERB-SURE,

DST, India; **Dr. Arvind Ingle** was nominated as Chairman, Communication Standing Committee, 'The International Association of Colleges of Laboratory Animal Medicine' (IACLAM); **Dr. Kakoli Bose** and **Dr. Jyoti Kode** were awarded the SERB, DST, Women Power Grant, 2022. Some of the students who received an award for their presentation at conferences were; **Ms. Aasna Parui, Mr. Shubhankar Dutta, Deepshikha Dutta, Akhila George, Shruti Kandekar, Manasi Nagare** and **Ms Dipti Sharma**.

The Cancer Research Institute also procured equipment such as a Bioruptor Sonicator, Water Purification Systems (MilliQ), Autoclaves, Speed Vacuum Systems, Ice-Makers, Nanodrop spectrophotometer, Biosafety Hoods, Water baths and Table–top Centrifuges through the Institutional funds, to cater to the growing needs of various laboratories and facilities, in the year 2022. Several other equipment through Corporate Social Responsibility [CSR] fund were also procured, such as; a Spectrophotometer (Shimadzu), Fluorescence Microscope (Olympus), Single Channel Pipettes, Water Bath and Vortex Mixers.

A brief description of some of the research areas pursued at the Cancer Research Institute:

In the **Biomolecular Structure, Function and Alteration** Group, the research focus of **Bose Laboratory** is on the study of macromolecules involved in the apoptotic pathway, and their implications in normal cellular functions and pathogenesis. The group works on the high-temperature requirement family of serine proteases (HtrA); the interaction between proteins of extrinsic cell death pathway, and the Bcl2 family proteins and their interacting partners. Moreover, the group is now entering into application-based translation research that includes enzymes involved in metabolic reprogramming and their role in altering cancer signaling pathways. The **Prasanna Laboratory** took measures to identify some FDA approved drugs that can be used to inhibit functions of some of the onco proteins under study. These structure guided identification of drugs that bind to the proteins were then tested for true binding using purified proteins and validated in cell lines. For the first time this laboratory showed how protein unfolding is initiated and propagated in a repeat protein in its crystalline form. A new signaling axis between oncoprotein PSMD10 and NFkB important for protecting colon cancer cells from TNF induced cell death was established. The **Varma Laboratory** pursues projects based on Genomics; Mapping of caner causing mutation to categorize their pathogenicity for translational research, Proteomics; Proteomics of Head and Neck squamous cell carcinoma treated with radiotherapy, Structure biology; structure determination of proteins such as

BRCA1/2, BACH1, MAPK, PML-RARA, Eph-Ephrin to unravel the protein structure at atomic level, Bioinformatics; study of model structure of protein to visualize the protein, and molecular dynamics & simulations to differentiate alterations in protein structure between wild-type and mutants. Seven PhDs and two project scientists are actively working on projects which led to five international peer reviewed publications in 2022. **Rukmini Laboratory** aims at delineating the molecular alterations mediating resistance to tyrosine kinase inhibitors (TKIs) in chronic myeloid leukemia (CML). Chronic myeloid leukemia is a hematological malignancy with triphasic clinical course. Inhibition of the tyrosine kinase activity of causative oncogene Bcr-Abl induces remission in 90% patients in the initial phase. In the advanced phase, more than 80% patients are resistant to the tyrosine kinase inhibitor imatinib, despite inhibition of Bcr-Abl activity. The laboratory is investigating the Bcr-Abl independent mechanism of resistance in advanced phase using multi-omics approach and has reported that PLAG1 amplification mediates reduced levels of β1integrin, which in turn leads to activation of Bcr-Abl pathway thereby leading to resistance to imatinib. In the **Cell and Tumor Biology** group, **Teni Laboratory** research programs aim to gain insights into the molecular basis of oral and cervical tumorigenesis. Inhibitor studies to target the deubiquitinases, which interact with and stabilize mutant p53 are ongoing. Evaluation of the role of Mcl-1 in radiation induced DNA damage response and autophagy in oral cancer cells is underway. Using knockdown strategies, the molecular mechanisms by which TCTP contributes to radioresistance is being explored in the in-house established radioresistant oral cancer cells. The role of HPV-16 in the generated chemoradioresistant cervical cancer cell line model is being assessed post E6/E7 knockdown. **Sorab Laboratory** demonstrated that the iron siderophore Lipocalin2 (LCN2), is required for therapy resistance in colorectal cancer cell lines by inhibiting ferroptosis and targeting LCN2 inhibits therapy resistance and tumour progression. Further, this laboratory has established a syngeneic mouse model that leads to disease progression in the colon with a concomitant increase in LCN2 levels and that loss of plakophilin3 leads to radio-resistance that is dependent on an intact autophagy pathway. Work from this laboratory has also identified novel mechanisms by which the 14-3-3 family of proteins regulate centrosome duplication and centrosome clustering, which is often disrupted in human cancers. **Hasan Laboratory** in collaboration with, '10X Genomics' conducted a 2 day workshop on single cell genomics in August 2022. This laboratory has secured an extramural grant of Rs 150 lakhs for a period of

three years from The Lady Tata Memorial Trust to conduct research on refractory Acute Myeloid Leukemia. The faculty participated in the 63rd Annual Congress of the Indian Society of Hematology & Blood Transfusion held in Kolkata as, 'faculty and 'Chair of a session in AML in November 2022. **Dr. Warawdekar** works on Gap Junctions- specialized cell-cell junctions. In 2022, evaluation of Connexin proteins in sub-cellular fractions in NSCLC adenocarcinoma and squamous pathologies showed Connexin 43 to be present in the mitochondria and nucleus. Identifying interacting partners as well as silencing these proteins could unravel a role in NSCLC. Under study is also tumour cell derived expression of proteins that lead to invasive properties. Breast cancer cell lines; BT474, MDA MB468 and MDA MB231 show higher levels of cellular Fibronectin(cFN) among breast cancer subtypes. ELISA showed presence of cFN in plasma of patients with breast cancer which was validated for non-degraded nature and molecular weight of 250kD with Western Blotting.The major research focus in **Patwardhan Laboratory** is to understand the novel role of exosomes in the invasion coupled metabolic rewiring of breast cancer cells in response to ECM stiffness. Work in this laboratory showed that ECM-rigidity regulates mitochondrial dynamics in breast cancer cells, with increase in mitochondria number and upregulation of mitochondrial enzymes and protein markers. Further, ECM stiffness reduces the lipid globules in the cells, indicating reprogramming of lipid metabolism. In parallel, the ATP/ADP ratio of cells is profiled in varying ECM stiffness to discern the role of exosomes in integrating cancer mechanobiology with bioenergetics. **Arandkar Laboratory** aims to understand the tumor-stroma cellular interaction and their role in tumorigenesis. Studies from this laboratory have shown IGFBP proteins were elevated in the cancer-associated fibroblasts and, the knockdown experiments could show that IGFBPs can alter the CAF phenotype. Another project, showed that TGFBI, a secreted protein, is a highly expressed stromal cell compartment, influencing stromal cell behaviour. The laboratory trained four students for post-graduate dissertation; presently, 3 PhD students are undergoing training. In the year 2022, this laboratory received a DBT-Ramalingaswami project (42.5 Lakhs) and a SERB –SRG grant (Rs.29 Lakhs). The PI was invited for a talk at an international conference and attended two National and organized one International conference in 2022. The **Carcinogenesis, Genome Biology, and Precision Medicine** group comprises of four investigators**;** The **Sarin Laboratory** focuses on inherited cancer syndromes. Histone proteins with site-specific post-translational modifications and polyadenylation of replication-dependent histone isoforms are emerging as key players in cancer and resistance mechanisms. Ongoing studies from **Gupta Laboratory** have shown the

polyadenylation of histone isoform mRNA under stress conditions due to the downregulation of SLBP and altered HuR/BRF1 levels, causes histone stress in the cell. Moreover, drug and hypoxia-induced resistance have shown altered mitochondrial structure and slow proliferation. Due to downregulated glycolysis and oxidative phosphorylation in drug-tolerant persistor or drug and hypoxia-induced resistant cells, the altered metabolic state resulted in hypoacetylation of chromatin. These studies suggest combining chromatin modifiers inhibitors targeting hypoacetylation with chemotherapy may offer better clinical outcomes. Cancer progresses through the accumulation of genetic and epigenetic changes resulting in gross genomic instability. In the **Mahimkar Laboratory** integrative analysis of genomic, transcriptomic, and methylomic data on OSCC revealed specific signatures of the differentially methylated promoter, and gene copy was associated with shorter survival. Clinically relevant biomarkers predictive of EGFR-targeted therapy response, which can guide treatment decisions in HPV-negative HNSCC patients were explored. High HIF1α and stem cell markers expression predict poor clinical response to chemo-radiation therapy (CRT) in HPV-negative HNSCC patients. Work in this laboratory demonstrated that both pre and post-treatment of polymeric black tea polyphenols (PBPs) inhibit carcinogen-induced oral tumors in hamsters. The **Dutt Laboratory** demonstrated an essential-and-sufficient role of a novel miR-944/MMP10/AXL-axis to predict nodal metastases in tongue cancer (*Comm Bio, 2022*). Work from this laboratory described the first comprehensive landscape of infectious-microbes across different epithelial cancers, including *Fusobacterium nucleatum* in tongue cancer with newer therapeutic option to manage the disease *(NAR Cancer, 2022*). Additionally, a three-tiered regulatory network wherein lincRNA *DSCAM-AS1* sponges *miR-130a* to downregulate *ER* expression in response to progesterone was presented (*Breast Cancer Res, 2022*). Also, findings from studies in lung cancer establish a significant occurrence of *EGFR T790M* mutation at low allele frequency following disease progression and extend the benefit of osimertinib treatment to these patients *(Translational Oncology, 2022*).In the **Therapy Resistance and Stem Cell Biology** Group, **Waghmare Laboratory** interests are to delineate the cell signaling pathways such as Wnt etc. that govern cancer stem cells in epithelial cancers. Secretory phospholipase A2 (sPLA2-IIA) overexpression in mice skin showed depletion of hair follicle stem cells with an increased c-Jun activation. sPLA2IIA in human breast cancer cell lines showed tumor reduction. Sfrp1, a Wnt inhibitor loss showed increased tumorigenic potential

of cancer stem cells in skin squamous cell carcinoma. Further, expression profiling on Sfrp1-/- CSCs revealed up regulation of EMT and Sox-2. Inverse co-relation of Sfrp1 expression was observed in human skin, HNSCC and breast cancer, which suggests its importance in clinical implications. The focus of the **Ray Laboratory** is to delineate the key molecular signatures associated with acquirement of resistance and metastasis in Epithelial Ovarian Cancer (EOC) and Gastric Cancer (GC). This Laboratory is also evaluating the effects of herbal compounds in sensitive and 5-FU resistant GC cells and the molecular association between wtp53/mp53 with HER2 expression and localization in GC cells and patients tissues. The **Shilpee Laboratory** works on understanding the molecular mechanisms of therapeutic resistance in glioblastoma and leukemia using patient derived cellular and pre-clinical mouse models developed in-house. In 2022, this laboratory identified that glioblastoma recurrent cells switch between ATM and ATR pathway to survive radiation stress (Medical Oncology Feb 2022). Additionally, it was shown that nano-delivery of chemotherapy via intranasal route suppresses in vivo glioblastoma growth and prolongs survival (Drug Deliver Trans Res. 2023 Feb) and bio-polymeric transferrin-targeted temozolomide nanoparticles have synergistic effect post-surgical GBM therapy (Nanoscale. 2022 Sep). Furthermore, this laboratory demonstrated that substrate stiffness regulates the recurrent glioblastoma cell morphology and aggressiveness.(Matrix Biology Dec 2022).The **Nandini Laboratory** is interested in understanding the molecular basis of variable responses to chemotherapeutic agents in a very aggressive breast cancer subtype, the Triple Negative Breast Cancer (TNBC). TNBC is a heterogeneous disease and has 4 different subtypes. Therefore subtype-specific cellular model systems that can be used to study drug resistance in TNBC are being developed. Phenotypic and molecular characterization of these cellular models suggests that there can be multiple cellular mechanisms involved in determining response to chemotherapeutics. Apart from this the laboratory is actively involved in research training to post-graduate students and subject specific lectures to undergraduate students. The **Cancer Theranostics and Clinical Pharmacology** Group comprises of two investigators. Research in **De Laboratory** focuses on molecular functional imaging of cancer in experimental animal model with true potential for translating basic research findings to the clinic. **Chilakapati laboratory** aims to develop and evaluate non-invasive and minimally-invasive Raman Spectroscopy (RS) approaches for detection of early alterations in cancers, with emphasis on oral cancers. RS

studies of blood, saliva, urine could stratify normal, tobacco habitué, oral premalignant, cancers and also prediction of recurrence in oral cancer subjects. Serum Raman spectroscopy could predict recurrence oral cancer subjects, stratification of pituitary adenomas and early cancer detection in experimental carcinogenesis. Also, plasma Raman studies show delineation of severity in corona subjects. RS could successfully assess radioresistance, chemoresistance, nanoparticle based targeted drug delivery and correlation between spectral features and biomarkers. In the **Tumour Immunology and Immunotherapy Group,** the **Kode Laboratory** focus is on investigating innate immune markers, soluble factors landscape and immune evasion in acute myeloid leukemia (AML) and oral cancer patients; understanding the crosstalk of leukemia blasts and mesenchymal stem cells in AML bone marrow microenvironment. Immunomodulatory effects of ayurvedic formulation are being tested in a clinical trial on ovarian cancer patients. Anti-cancer and immunomodulatory effects of various phytoextracts are being studied for regulating innate immune mechanisms and immune-mediated cell cytotoxicity. This Laboratory has identified CD26, an immunoregulatory-enzyme and few immune subtypes as prognostic biomarkers for Graft-versus-Host disease and other clinical outcomes post-allogeneic stem cell transplantation in cancer patients. The **Khadilkar Laboratory** has been investigating how stem cell and tissue homeostasis is altered in disease versus developmental conditions. The effect of genetically modulating cellular ageing in the stem cells to understand its effect on organ homeostasis is under study. The laboratory is modelling epithelial cancers in *Drosophila* and uses *Drosophila* tumor models to study the mechanisms underlying tumor induced cachexia. The laboratory is particularly investigating whether Drosophila blood cells play an active regulatory role in controlling cancer cachexia.

Centre for Cancer Epidemiology

The **Centre for Cancer Epidemiology** focuses research at community level to identify burden, life style and genetic risk factors screening strategies for cancer prevention/early detection. The Center conducts PhD programme in Epidemiology and MSc in Epidemiology and Public health. The Centre has developed collaboration with numerous International and National (IITs , IIPS) organizations. To fullfill these goals the Centre has been organized into **seven** department/divisions: **Department of Preventive Oncology** is a designated WHO Collaborating Centre for Cancer Prevention, Screening and Early Detection (IND 59), Region

SEARO, since 2002. In year 2022, Preventive Oncology Services were expanded to its Rural Spoke Centre at Khopoli, Raigad District Maharashtra State. Preventive Oncology provides services and conducts activities through its 5 main thrust areas: ***Information, Education And Communication (Iec),*** Programmes for risk prevention, life style modification and improving health seeking behavior such as Tobacco & Alcohol Cessation towards early detection of common cancers in India; ***Cancer Screening Services: Clinic and Community-based,*** Programmes for Screening of Common Cancers and risk assessment for High Risk cancers; ***Health Manpower Development,*** Total **8625** Health Personnel's were trained at TMH Mumbai [8470] and Rural Spoke PO services at Khopoli, Raigad [155] for the organization and implementation of cancer control programs; **Research & Publications,** Total 15 Research studies are ongoing for developing newer methods and strategies for the prevention and early detection of common cancers in India. A total of 16 research papers were published in International [3], National [13] indexed journals; ***Advocacy, Ngo-Training and Networking,*** for Dissemination of cancer control activities; ***Special Services- Covid 19 Vaccination Centre,*** Total 32546 beneficiaries were vaccinated for COVID; The **Division of Medical Records and Cancer Registries** monitors and executes the population-based cancer registries at Chandigarh, Sangrur, Mansa, SAS Nagar, Varanasi, Muzaffarpur, Vizag, Ratnagiri, and Sindhudurg districts covering around 17 million populations. Annual reports of cancer registries are regularly published by the department and also the hospital-based cancer registries at various TMC units are monitored. The Khordha district (Bhubaneswar), Odisha PBCR was established in 2022. This department provides technical support to cancer registries from Nepal, Bhutan, Sri Lanka, Indonesia, and Timor-Leste. In the year 2022, three virtual training programs in cancer registration with around 150 participants in the course from cancer registries of the SEARO region were conducted. The department staff actively participated in the International Association of Cancer Registries (IACR) virtual conference 2022 where two oral presentations along with 20 posters were presented. The department of medical records is the custodian of the patient's case files of Tata Memorial Hospital (TMH). Although most of the records are in electronic format, the inpatient death files are retained in the department as per the TMH retention policy of medical records. During 2022, case files received/issued by the MRD were 1,762 of which 1,548 were death cases, 68 were COVID-19 death cases and 65 case files were discharge against medical advice (DAMA). Apart from this,

the department handled RTI queries. The project on early detection of oral, breast, and cervical cancer is on-going at Sangrur. More than 2500 symptomatic have been screened. More than 65 cancer cases were diagnosed and treated at Homi Bhabha Cancer Hospital (HBCH) Sangrur. The department is running the Tobacco Quit Line (TQL) Services. In the last four years, there were more than 13,500 quitters. The TQL staff has conducted several awareness programs in different places such as Pandharpur, Yermala, and at Gondawale. This department plays an important role in cancer registration and cancer control activities; **Division of Hospital Based Cancer Registry & Patterns of Cancer Care** mainly manages two service projects which are HBCR (Hospital Based Cancer Registry) and POCSS (Patterns of Care and Survival Studies). In HBCR, a total of 36,777 new cancer cases in TMH and 1303 new cancer cases in ACTREC registered during the year 2019 were abstracted by the trained staff and submitted to ICMR. In both the centers the leading site of cancer in males and females were buccal mucosa and Breast respectively. A total of 28905 referral cases got registered in TMC Mumbai in 2019. In POCSS service, comprehensive clinical and survival information was abstracted for the following sites H & N (3562), Breast (3593), Cervix (982) and other gynaecological malignancies (1215). Hematolymphoid data abstraction is ongoing. The POCSS service has been extended to other TMH Centres like HBCH Sangrur, MPMMCC Varanasi and HBCHRC Visakhapatnam in 2022. In-house software for unified entry of HBCR & POCSS data was developed and implemented, linkages with various modules like MOIS, ROIS, OT, PABR, CIS was also carried out for minimizing the duplication of work and to improve the manpower efficiency. A total of 4 articles (1 international, 3 national) and annual report of HBCR 2019 was published in the year 2022. Training workshops were conducted for KEVAT students and AFMC doctors. The department staff has participated in 6 workshops as delegates and 4 workshops as faculty in 2022. Cancer awareness sessions were conducted for police personnel at Navi Mumbai Police Headquarters & at CIDCO for their personnel in view of World No Tobacco Day and for population in Pen, Raigad district in view of DAE's Azaadi ka Amrit Mahotsav week. This Division has hosted all the sessions of Academic programme, CCE and participated as faculty in 2 sessions of the programme; **Division of Molecular Epidemiology & Population Genetics** conducts research in the field of Molecular Epidemiology and Population Genetics. The main thrust is on accurate measurement of exposures and to investigate life style, environmental and genetic risk factors for common cancer sites in India by using case

control and longitudinal cohort study designs. The research methodology for Molecular Epidemiological studies at population level has been established by providing vigorous training to various centres of TMC. The major achievements comprise of; establishment of automated BioBank for storage of 3 million samples at -80C, establishment logistic and processes (including software) for population based studies, establishment of pipeline and workflow for genotyping and sequencing of large number of samples; **Division of Cancer Surveillance for Special Population (CSSP)** was established in July 2021 in the premises of CCE, ACTREC. The total staff strength of CSSP and NPP registries is 40. The main mandate of CSSP is to Setup Population registries in Nuclear Power Plant locations in India, Accrual of Cancer data in the special population, analysis and reporting annually. In the year 2022, data of the years 2017-18 of the 4 PBCRs report, Tarapur, Kaiga, Rawatbhata and Kakrapar registry reports were published. Compilations of these registries data of the years 2019-20 is completed and will be published shortly. A periodical review and training Orientation for the registry staff was conducted. Expertise to conduct Epidemiological health survey in Rawatbhata was provided, which included design, implementation, data collection process, software development and analysis plans. A Review of Division's progress was presented twice in March and September, 2022, to the CCE Director and Deputy Director, and all staff as a part of the scientific programme of CCE; **Unit for Strengthening Cause of Death Data (USCOD)**, the Unit for Strengthening Cause of Death Data (USCOD) was established on 6th August 2021. The Unit has received support from the Office of the Registrar General of India. The Unit's resources comprise of an e-Learning course, manuals, pocket manuals, YouTube informational videos, face-to-face training of trainer workshops. The link https://tmc.gov.in/USCOD/Home.aspx and the USCOD YouTube channel- Unit for Strengthening Cause of Death Data – YouTube are net –based sites through which information on medical certification of cause of death (MCCD), civil registration and vital statistics (CRVS) and the overall activities of the Unit can be obtained .The Unit develops resources on cause of death improvement activities, following World Health Organization and United Nations Statistics Divisions standards, builds capacity in cause of death improvement activities in Indian government and non-governmental agencies in cause of death activities, such as medical certification of cause of death, mortality coding (ICD 10 and ICD 11), implementation of Iris, production of vital statistics reports, etc., facilitates improvement in cause of death quality standards through advocacy efforts. **Access to**

Affordable Cancer Care for One and All Project, this is a project initiated to make cancer care accessible to people living in districts and bring down incidence of its preventable forms, Tata Memorial Centre (TMC) conceptualized project titled "Access to Affordable Cancer Care for One and All" in 2016.This project initially launched on a pilot basis in 6 districts of Maharashtra, has now expanded in 34 districts of Maharashtra. In 2019 it was scaled up at the national level. The broad scope of activities conducted under this project are state level awareness and sensitization workshops along with train the trainer programs, development of screening protocols and training modules for oral, breast and cervical cancer, an infrastructure and skill gap analysis study at District Hospitals, on-site district level training program on early detection of common cancers and 15-day hands-on training program for strengthening Preventive, Medical and in surgical oncology skills of health services staff.

Academics at ACTREC

To fulfill the third mandate of the Centre, strong momentum is given to its educational programs. The main focus is on its doctoral program conducted under the aegis of the Homi Bhabha National Institute – a deemed university recognized by the University Grants Commission. Between January and December 2022, a total of 117 graduate students were working towards the Ph.D. degree in Life Sciences at ACTREC; these included 25 JRF 2022 batch students who joined between August and September- 2022. Under the short term and summer training program, a total of 285 trainees worked in close supervision of the Centre's faculty during the year; these included 88 MSc dissertation students. In 2022, the Centre organized 48 local/ national/ international conferences, symposia, workshops, training programs, of which only 3 were shared on a virtual platform. ACTREC observed and celebrated days of National and International importance, some of which were the Republic Day, the Independence Day, Women's Day, Sadbhavana Diwas, Hindi Diwas and the Fire Service Week. The Vigilance Awareness Week was observed between October 31st and November 6th in 2022. The Centre conducts Yoga sessions as a part of the staff welfare activity. In 2022, the 8th International Yoga Day was held on the 21st June with the theme, "Yoga for Humanity" and included sessions on Desk Yoga and Breathing Exercises to de-stress the body and mind. The event was organized virtually and observed by staff and students in accordance to the pandemic protocol.

ACTREC Annual Events

Science and Society Oration



Padmavibhushan Dr. R. Chidambaram, Ex-Chairman-Atomic Energy Commission, AICTE Distinguished Professor, DAE Homi Bhabha Chair Professor, was invited to deliver the Science & Society Oration 2022, which was held at ACTREC on 6th May, 2022. Dr. R A Badwe, Director, Tata Memorial Centre, extended warm greetings to the eminent guest and expressed that the insights provided from Physics, Economy and Knowledge could empower understanding of an area of scientific research and lead to an expanded spectrum of knowledge. Dr. Prasanna Venkatraman, Deputy Director, CRI, welcomed and introduced the distinguished guest, and inspired the audience comprising of clinicians, scientists, staff and students of ACTREC, with a detailed biographical account of his academic achievements, and honours bestowed throughout his high-profile career.

Dr Chidambaram presented an interesting and relevant topic with his talk entitled, 'To Become a Knowledge Economy'. He introduced this title to the audience by defining the term, 'Knowledge Economy' –which would be to develop new knowledge as well as appropriate knowledge. New knowledge relevant to the needs of the country has to be developed. He projected the general perspective of Indian Science- some areas need to be developed- 'Knowledge Economy' needs both an advanced technology superstructure and the foundation

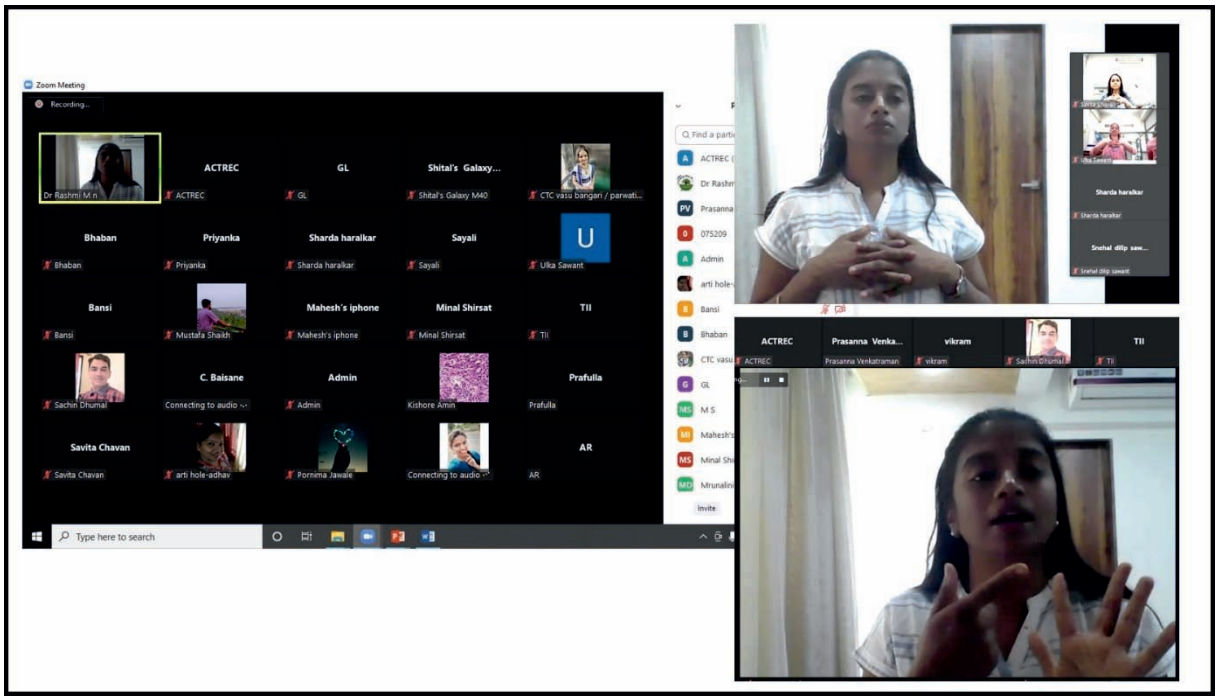
of higher education and basic research. India's technology needs, range from nuclear and space to rural development. He added that, "Basic Research is also a cultural necessity in any civilized country and there is a need for-Directed Basic Research".

Dr. Chidambaram mentioned about the book- 'Advice to young Scientists' by the Nobel Laureate, P B Medawar- and said that the goal should be to focus on interests, important problems- both important to Science and important to Society. Another aspect he expounded on was that scientific research need not necessarily be in areas which will produce the largest number of publications and could be in completely new areas like critical technology areas which are important for the country,-for society and for industry. He cited an example of, Edward Purcell who was awarded the Nobel for Physics in 1952 for co-developing NMR spectroscopy with only 7 publications at the time of winning the award. Further he compared India of the early twentieth century with examples of stalwarts in science like Dr. CV Raman and Dr. Satyen Bose, whose scientific pursuits were driven by a need for self-examination and also to show the developed western countries of the intellectual and scientific capabilities of India. So, he added, that today's motivation should be to make India a, 'Developed Country and a Knowledge Economy'. India of our dreams should be, economically developed, scientifically advanced and militarily self-reliant. Technology foresight and predictions in Science and Technology are important but should be updated with new scientific discoveries relevant for development. The example cited was historical and of USA; nuclear fission which was being researched yet the scientific and engineering statesman had missed this area of nuclear energy for the forthcoming years. Dr. Chidambaram's talk was extensive and encompassed; renewable energy utilization, climate change, serendipity in science-discovery of penicillin, artificial intelligence and use of AI tools in cancer diagnostics.

The talk ended with a couple of questions from students and faculty like funding for basic research, academia and industry collaborations, facilitating cross-talk via interdisciplinary research, Solvable path for India to achieve self-reliance in manufacturing of high-precision equipment and nuclear energy production.

ACTREC witnessed an amazing Science and Society Oration in 2022 with the spell –bound audience as a living proof!! To conclude the session, the 'vote of thanks' was delivered by Dr. Prasanna Dep. Dir. CRI, ACTREC.

International Day of Yoga (IDY-2022)



The ACTREC Administration- Public Relations Cell, in accordance with the Ministry of AYUSH guidelines, observed the "8th International Day of Yoga" (IDY) on 21st June 2022. The Ministry of Ayush (MoA), has been taking various steps to boost the adoption and acceptance of practice of Yoga. This form of physical exercise includes safe practices to improve mental, physical, emotional, and spiritual health of the population. In 2022, a 60 min Virtual Yoga Workshop was conducted and the trainer, Dr. Rashmi M. Nookala, (MD (Ayu.), PGTYTD (Yoga), MA in child Mental Health) emphasized on a very important aspect of human health; Yogic Affirmations to train the Sub Conscious Mind, and Breathing Exercises. The session was very engaging and magical. The key highlights of the program were: Learning Yogic Affirmations; Destressing; Relaxing Mind and Body; Enhancing Inner peace and Improving posture and flexibility. At the end of the session, it was reiterated, that Yoga is safe and beneficial but like any other health programs, it needs to be practiced judiciously, correctly, and cautiously.

Rashtriya Ekta Diwas



Honoring the directive received from Department of Atomic Energy, Government of India, Rashtriya Ekta Diwas was observed in ACTREC on 31st October, 2022. Paying tributes to Honorable Shri. Sardar Vallabhbhai Patel (the Iron Man of India) for his exceptional contribution towards Indian unity and integrity, a Rashtriya Ekta pledge was administered by the dignitaries present for the program.

The Chief Guest for the program was Shri. Jai Jeet Singh, IPS, Commissioner of Police, Thane. The Rashtriya Ekta Pledge: in Hindi was led by Dr. Sudeep Gupta, Director ACTREC, TMC ; in the English language was led by Dr. Navin Khattry, Dy. Director, CRC, ACTREC and in Marathi by Dr. Rajesh Dikshit, Director CCE, ACTREC, TMC. The pledge taking ceremony was followed by the National Anthem and a vote of thanks.

Samvidhan Diwas (Constitution Day)



In accordance with guidelines received from Ministry of Parliamentary Affairs, Government of India and subsequently from DAE, Samvidhan Diwas (Constitution Day) is observed at ACTREC. The date 26th November is observed as Samvidhan Divas (Constitution Day). In the report year it was observed on 28th November, 2022(Monday) in the KS Main Auditorium. The theme for the year 2022 was, "India-the Mother of Democracy." The program commenced with a welcome address and a brief on the significance of 26th November as the 'Constitution Day'. This was followed by reading the preamble of the Indian Constitution, by Dr. Navin Khattry, Dy. Director CRC, in English and by Mr. M.Y. Shaikh Administrative Officer, ACTREC, in Hindi. There were around 50 employees for the program which ended with a vote of thanks and singing of the National Anthem.

AUGMENTATION OF RESOURCES

Important TMC projects located in the ACTREC campus made good progress during 2022. In February, the foundation brick-laying ceremony of **Shanghvi Block (Shantilal Shanghvi Pediatric Hematolymphoid Cancer Centre),** a project generously sponsored by the Shantilal Shanghvi Foundation, was held at ACTREC.

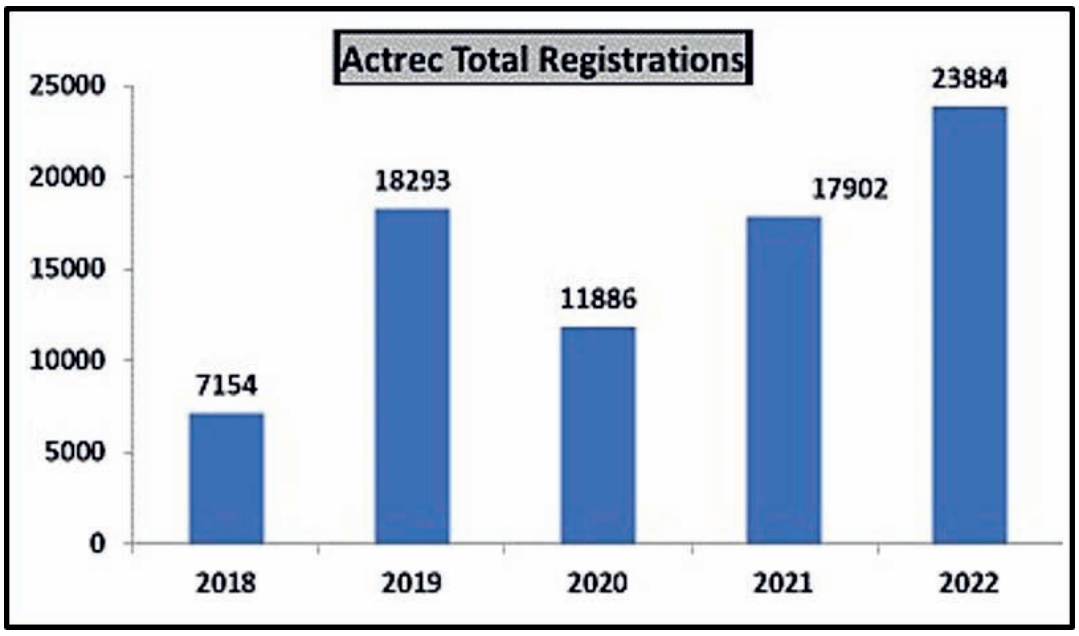


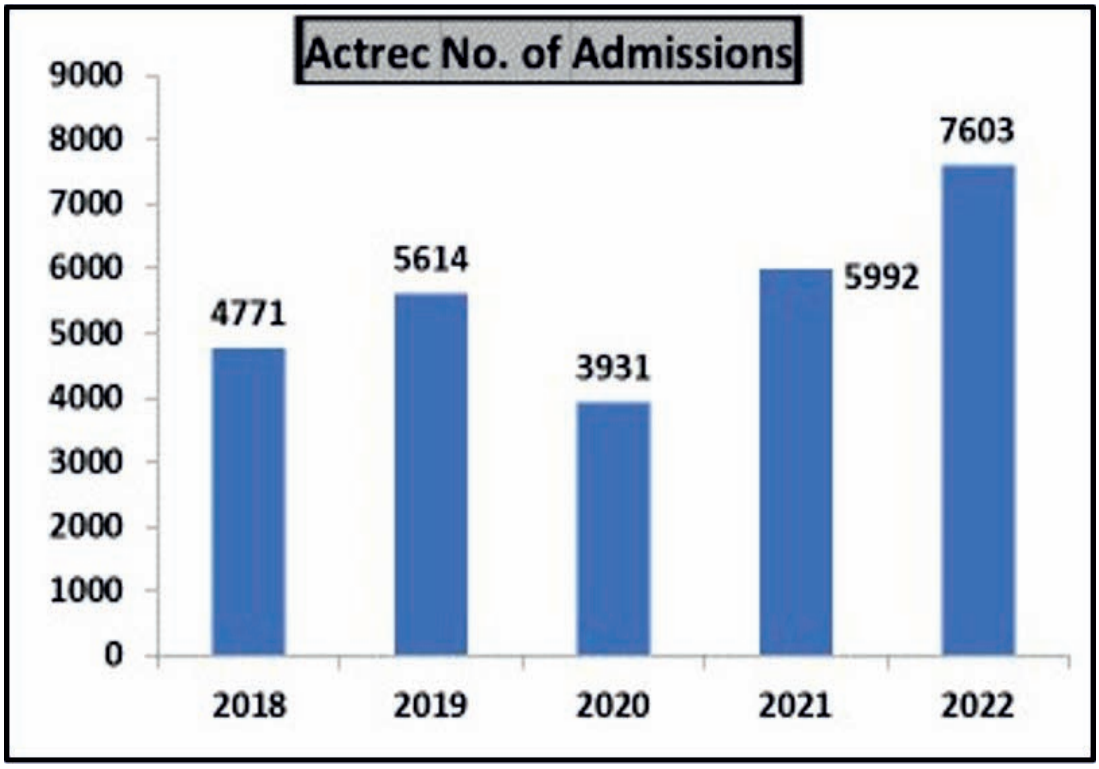
The Comprehensive Hematolymphoid Cancer Centre will have ground plus 16 floors with a total area of 2, 60,000 square feet. The Unit facilitates Out Patient Department, 140 Day care beds, 240 In Patients beds, 25 beds for BMT patients and 30 ICU beds. Advanced Laboratories, Imaging facilities, Transfusion Services and Stem Cell Collection units will be the added facilities.

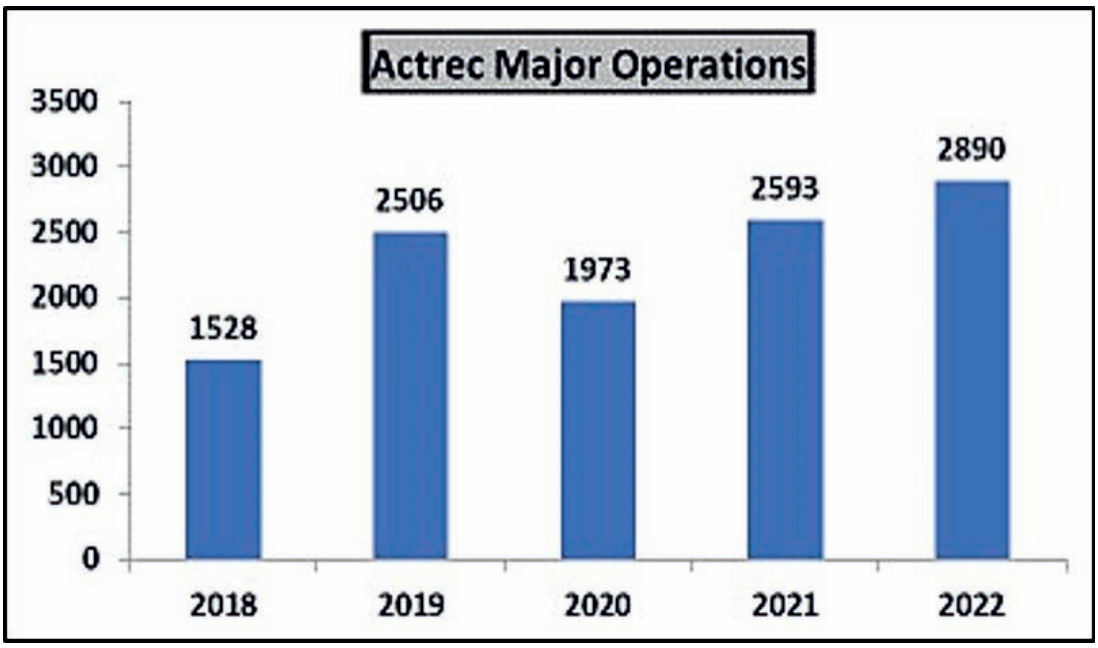
The indigenously built **FDM 3D Printer** was inaugurated by Dr. R. A. Badwe, Director, TMC, and Dr. Sudeep Gupta, Director, ACTREC, on 5th April 2022.

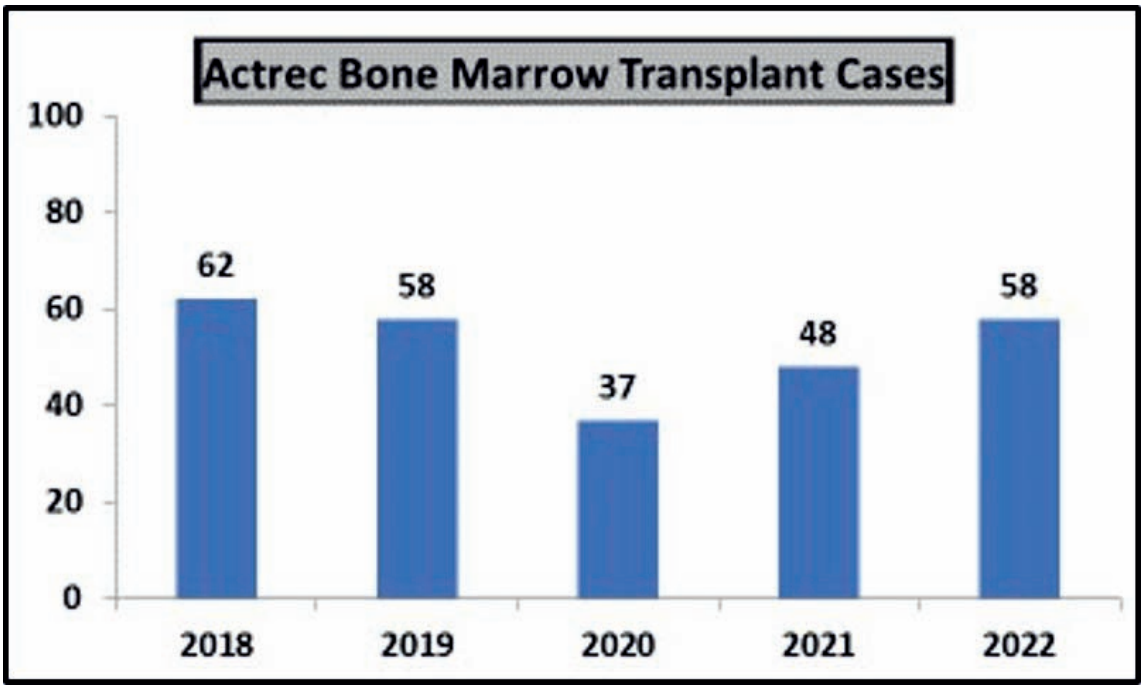
The **Raja S. Rao Shodhika** was inaugurated comprising of an Operation Theatre Complex, ICU complex & Post-Operative Recovery and a Day-Care Ward. Besides this the **New Modular Operation Theatres** located in the Raja Rao Shodhika were inaugurated in September 2022.

TRENDS – ACTREC






Actrec Major Operations
3500
3000
2500
2000
1500
1000
500
0
1528
2506
1973
2593
2890
2018
2019
2020
2021
2022


Actrec Bone Marrow Transplant Cases
100
80
60
40
20
0
62
58
37
48
58
2018
2019
2020
2021
2022

PERFORMANCE STATISTICS ACTREC	2021	2022
General New Patient Registrations– (1).....	13490	2440
Private New Patient Registrations–(2)	4411	378
Total New Patients – Total (1+2) – (3)	17901	2818
Patient Referrals for Investigations – (4)	3564	2657
Patients Referred for Consultation (Expert Opinion) – (5)	328	371
Preventive Oncology Patients – (6)	SNA	
Total Patient Registrations (3+4+5+6)	21793	5846
INPATIENT SERVICES		
Total Beds	132	300
Number of Admissions.....	5992	7603
Average Length of Stay (Days)	5.15	4.62
Bed Occupancy %	83.74	80
SURGICAL ONCOLOGY		
Major Operative Procedures	2593	2890
Minor Operative Procedures.....	1058	582
Robotic Surgery	SNA	NA
MEDICAL ONCOLOGY		
Day Care- General	19230	26316
Day Care- Private	3068	4272
Number of Bone Marrow Transplants	48	58
DIGESTIVE DISEASES AND CLINICAL NUTRITION		
Endoscopies	06	21
Nutrition Clinic	SNA	22386
ANAESTHESIOLOGY, CRITICAL CARE & PAIN		
Number of ICU Admissions	2820	3106
Patients in Recovery Ward	2415	2653

Pain Clinic	960	1142
RADIATION ONCOLOGY		
External Beam Therapy	1161	1074
Brachytherapy	86	247
Treatment Planning / Beam Modification	1137	1550
IMAGING SERVICES		
Conventional Radiography	3619	5119
Ultrasound / Color Doppler	2625	4961
Mammography	1988	2494
C.T. Scan (Diagnostic)	6265	10079
C.T. Scan (for Radiotherapy Planning)	1174	
M.R.I Scan	2897	4691
Interventional Radiology	863	1860
Bone Densitometry.....	SNA	SNA
NUCLEAR MEDICINE		
PET-CT Scan	2782	3905
SPECT-CT Scan	SNA	SNA
SPECT- Scan	SNA	SNA
C.T. Scan (Diagnostic)	SNA	SNA
High Dose Therapy	SNA	SNA
GENERAL MEDICINE		
ECG	3933	4604
Echo Cardiograph	2438	2922

Pulmonary Function Tests	SNA	SNA
LABORATORY DIAGNOSTICS		
Pathology - Histopathology + IHC + Frozen Section	16696	1,01,493
Biochemistry		
Cytopathology	67295	905
Molecular	SNA	
Pathology.....	SNA	SNA
Microbiology	19024	21668
Bacteriology	8554	10883
Mycobacteriology	93	82
Mycology	184	176
Serology	7191	7332
Clinical Microbiology	2591	3195
Hematopathology.....	61046	72173
Cytogenetics.....	23325	26871
Flow Cytometry & Molecular Hematopathology		
Bone Marrow Aspiration Morphology	5476	6154
Flow Cytometric Immunophenotyping	6991	7366
Molecular Hematopathology	9789	10838
Transfusion Medicine		
Blood Components Prepared [Whole Blood + packed Red Cells + Platelets (RDP)+ Fresh Frozen Plasma + Cryoprecipitate + Factor VIII Deficient Plasma]	5828	5220
Single Donor Platelets (SDP) prepared.....	1160	1314

Specialized Procedures (Irradiation of blood Products+ Granulocyte Harvest +Therapeutic Leukapheresis + Therapeutic Plasma Exchange)	5235	5425
Laboratory Investigations [Blood Grouping +Cross matching+ Antibody Detection]	23594	28482
Blood Units Collected	3446	3568
Platelet Pheresis.....	1160	1314
HLA Lab		
HLA Typing	5766	6108
Antibody Screening	143	197
OTHER CLINICAL SERVICES		
Central Venous Access Devices (CVAD) Clinic	SNA	SNA
Stoma Clinic.....	SNA	SNA
Occupational Therapy	SNA	SNA
Physiotherapy	8702	8673
Speech & Swelling Therapy	SNA	SNA
Psychiatry and Clinical Psychology	SNA	SNA
Dental Services		
General Dentistry	3558	4900
Prosthetics Services	85	192
Tissue Bank		
Allografts Produced	SNA	
Palliative Medicine		
Number of Patients	SNA	
Home Care Visits	SNA	
Medical Social Service		
Number of Beneficiaries for Accommodation	1000	1493
Number of Beneficiaries for Financial support	576	995

EDUCATION Residents & Others Fellows Medical Observers Nursing Trainees Paramedical Students Medical Physicists trainees Medical Laboratory Trainees **RESEARCH PROFILE** Extramural Projects Pharmaceutical Company Sponsored Intramural +Extramural Projects Institutional Intramural Projects Nil Funding Postgraduate Student Thesis (Dissertation) **Publications** International National Book Chapters **Conferences / Workshops / Seminars** **Wherever applicable, mention:** **DNA** for Data Not Available. **NA** for Not Applicable **SNA** for Services Not Available		

Performance Statistics of CRC

	Number only	Details
Extramural Projects		Cytogenetics (1); DTM (1);
Pharmaceutical Company sponsored Projects		
Intramural + Extramural (Projects)		Composite Lab (4); Cytogenetics(1);DTM(1); TRL (7);
Nil Funding		DTM (1); Microbiology (3)
Postgraduate Student Thesis (Dissertation)		Cytogenetics (3); DTM (1)
Publications		Composite Lab (4); Cytogenetics (6); DTM (3); Microbiology (5); TRL (5)
International		Composite Lab (2); Cytogenetics (3); DTM (3); Microbiology (4); TRL (4)
National		Composite Lab (2); Microbiology(1)
Books		Cytogenetics (1)
Book Chapters		Cytogenetics (2) ;TRL (1)
Conferences/Workshops/ Seminars		Composite Lab (3); Cytogenetics (20); DTM (4); Microbiology (7); TRL (3)
Patents		
Awards and Recognition		Cytogenetics (4)
Medicines Dispensed (Value in INR lakh)		Rs. 50,42,29,837.00 (MS Office/ Dispensary)

Performance Statistics of CRI

	Number only	Details
Extramural Projects	35	Arandkar (2);Bose (5); Chilakapati (2); (Dutt(3); Gupta (1); Hasan(2); Khadilkar(3);Kode(4); Prasanna(3); Shilpee(3);Sorab(1)Varma (2); Waghmare(4)
Pharmaceutical Company sponsored Projects	3	Hasan(1); Patwardhan(1); Prasanna (1)
Intramural Projects +Extramural Projects	47	Arandkar(2); Bose (6); Chilakapati (2); Dutt(3); Gupta (5); Hasan (2); Khadilkar (5); Kode(4);Prasanna (3); Shilpee (4); Sorab(1);Teni (3);Varma(2)Waghmare(5)
Nil Funding	12	Jyoti Kode (6); Rukmini (4); Warawdekar (2)
Postgraduate Student Thesis (Dissertation)	38	Arandkar (6); Chilakapati (3); Dutt(1); Hasan(2); Khadilkar(6); Kode(4);Ingle (2) Patwardhan(1); Prasanna(2); Shilpee(1); Sorab(3); Teni (2); Waghmare(1); Warawdekar(4)
Publications	91	Arandkar(1);Bose(18); Chilakapati (10); Dutt (9);Gupta (5);Hasan (1);Kode(6);Ingle(12);Patwardhan(1); Prasanna(5); Shilpee(8);Sorab(3);Teni(2);Varma(5);Waghmare(4); Warawdekar(1)
International	69	Arandkar(1);Bose(6); Chilakapati (9);Gupta (5);Hasan(1); Kode(6);Ingle(7);Patwardhan(1); Prasanna(5); Dutt (9); Sorab(3)Shilpee(5);Waghmare(3);Warawdekar(1);Teni(2) ; Varma(5)
National	6	Ingle(5); Shilpee (1)
Books	1	Bose (1);
Book Chapters	15	Bose (11);Shilpee(2);Waghmare(1);Chilakapati (1)
		Arandkar (4); Bose (8); Chilakapati (5); Dutt(32); Gupta (3); Hasan (2); Khadilkar (5); Kode (25);

Conferences/Workshops/ Seminars	**100**	**Ingle(2);Patwardhan(3);Prasanna (2); Shilpee (3); Sorab(3);Varma(2);Waghmare (1)**
Patents	**5**	Kode (4); Shilpee(1)
Awards and Recognition	**34**	**Bose (3); Chilakapati (2); Dutt (1); Gupta (2); Hasan (1);Kode(22); Ingle (1); Shilpee (1); Teni (1)**

CLINICAL RESEARCH CENTRE

Dr. Sudeep Gupta (Director, ACTREC)

Dr. Navin Khattry (Dy. Director, CRC-ACTREC)

Anesthesiology, Critical Care and Pain

Dr. Reshma Ambulkar

Dr. Bhakti Trivedi *(OIC)*

Dr. Amol Kothekar

Dr. Malini Joshi

Dr. Raghu Thota

Dr.Ketan Kataria

Dr. Ashwini Rane

Dr. Anjana Wajekar

Dr. Mahima Gupta

Cancer Cytogenetics

Dr. Dhanlaxmi Shetty *(OIC)*

Ms. Hemani Jain

Cancer Genetics

Dr. Rajiv Sarin

Clinical Pharmacology

Dr. Vikram Gota *(OIC)*

Dr. Manjunath Nookala

Clinical Research Secretariat, ACTREC

Dr. Jayant Goda Sastri *(OIC)*

Mrs. Sadhana Kannan

General Medicine

Dr. Prafulla Parikh

Dr. Sujit Kamtalwar

Dr. Ashwini More

Hematopathology

Dr. Subramanian Ganesan *(OIC)*

Dr. Nikhil Patkar *(Clinician Scientist)*

Microbiology and Composite Laboratory

Dr. Vivek Bhat *(OIC)*

Dr. Preeti Chavan *(OIC)*

Nursing

Dr. Meera Achrekar *(Deputy Nursing Superintendent)*

Ms. Anjali Rawat *(Asst. Nursing Superintendent)*

Pathology

Dr. Epari Sridhar *(OIC)*

Dr. Asawari Patil

Dr. Swapnil Rane

Radiation Oncology

Dr. Tejpal Gupta

Dr. Vedang Murthy

Dr. Supriya Shastri

Dr. Jayant Goda Sastri

Dr. Tabassum Wadasadawala

Dr. Sangeeta Kakoti

Dr. Priyamvada Maitre

Dr. Shwetabh Sinha

Dr. Jifmi Jose

Dr. Revathy Krishnamurthy

Radiodiagnosis and Interventional Radiology

Dr. Nitin Shetty *(OIC)*

Dr. Amit Kumar Janu

Dr. Kajari Bhattacharya

Dr. Daksh Chandra

Dr. Nivedita Chakraborty

Surgical Oncology

Dr. Prashant Tembhare *(Clinician Scientist)*
Dr. Gaurav Chatterjee
Dr. Sweta Rajpal
Dr. Shruti Choudhary
Mrs. Swapnali Joshi
Dr. Vani Parmar
Dr. Sajid Qureshi
Dr. Aliasgar Moiyadi
Dr. Vinay Shankhdhar
Dr. Sudhir Nair *(OIC)*
Dr. Deepa Nair

Clinician Scientist Laboratory

Dr. Sudeep Gupta

Medical Administration

Dr. Prashant Bhat *(Medical Superintendent)*
Mrs. Chital Naresh

Medical Physics

Dr. Jamema S V
Ms. Reena Phurailatpam
Mr. Kishore Joshi
Ms. Jeevanshu Jain

Medical Oncology

Dr. Sudeep Gupta
Dr. Navin Khattry
Dr. Amit Joshi *(OIC)*
Dr. Anant Gokarn
Dr. Sachin Punatar
Dr. Sumeet Mirgh
Dr. Akansha Chichara
Dr. Prakash Shetty
Dr. Vineet Kumar
Dr. Manish Pruthi
Dr. Parthiban Velayutham

Transfusion Medicine

Dr. Shashank Ojha *(OIC)*

Dr. Sumati Hiregoudar

Dr. Minal Poojary

Dr. Suryatapa Saha

Translational Research Laboratory

Dr. Indraneel Mittra *(Dr. Ernest Borges Chair)*
Dr. Ranjan Basak
Dr. Kavita Pal
Dr. Raghuram GV
Mr. Naveen Khare

Anesthesiology, Critical Care and Pain Department

Officer-in-Charge:Dr Bhakti Trivedi

Anesthesiologists: Dr. Reshma Ambulkar, Dr. Raghu Thota (Resigned-August 2021), Dr. Malini Joshi, Dr. Ketan Kataria, Dr. Ashwini Rane, Dr. Anjana Wajekar, Dr. Mahima Gupta, Dr. Veer Thakar (Joined in October 1" 2021)

Intensivist: Dr. Amol Kothekar

The Department of Anaesthesiology, Critical Care and Pain increased the services to 6 major OTs from 23 September 2022 in the new Raja S Rao Shodhika. This new complex has 13 major OTs and a state of art Hybrid OT to cater to patients from the various DMGs.

The department provided Anaesthesia services to 2890 major cases, 96 minor cases (including Endoscopy), 631 Interventional Radiology cases, 245 cases in Radiotherapy OT. The Critical Care Unit increased from a 10-bedded ICU (3 isolation beds) plus a 3-bedded PACU with a CPR team to a 16 bedded ICU and a 24 bedded RR. Critical Care was provided to 444 patients (159 - ventilated) and 2653 patients were admitted to RR. 7 patients under went dialysis with a total of 28 sessions.

ICU had 9 procedures. The Acute Pain services catered to 1142 patients.The Pre-anaesthesia clinic saw 1928 patient and the Pain clinic had 398 patients.

Cancer Cytogenetics Department

Officer-in-Charge: Dr. Dhanlaxmi Shetty

Scientific Officers: Ms. Hemani Jain

Dr. Swapnali Palkhiwale

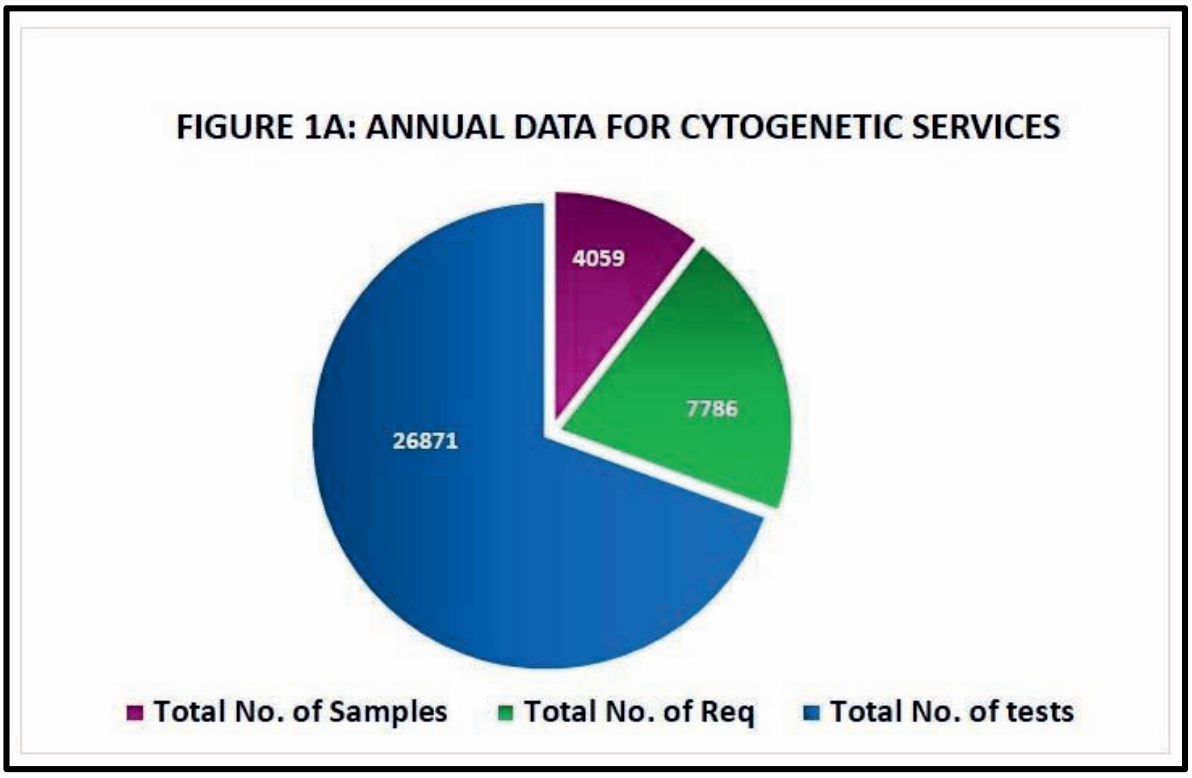
Dr. Purvi Mohanty

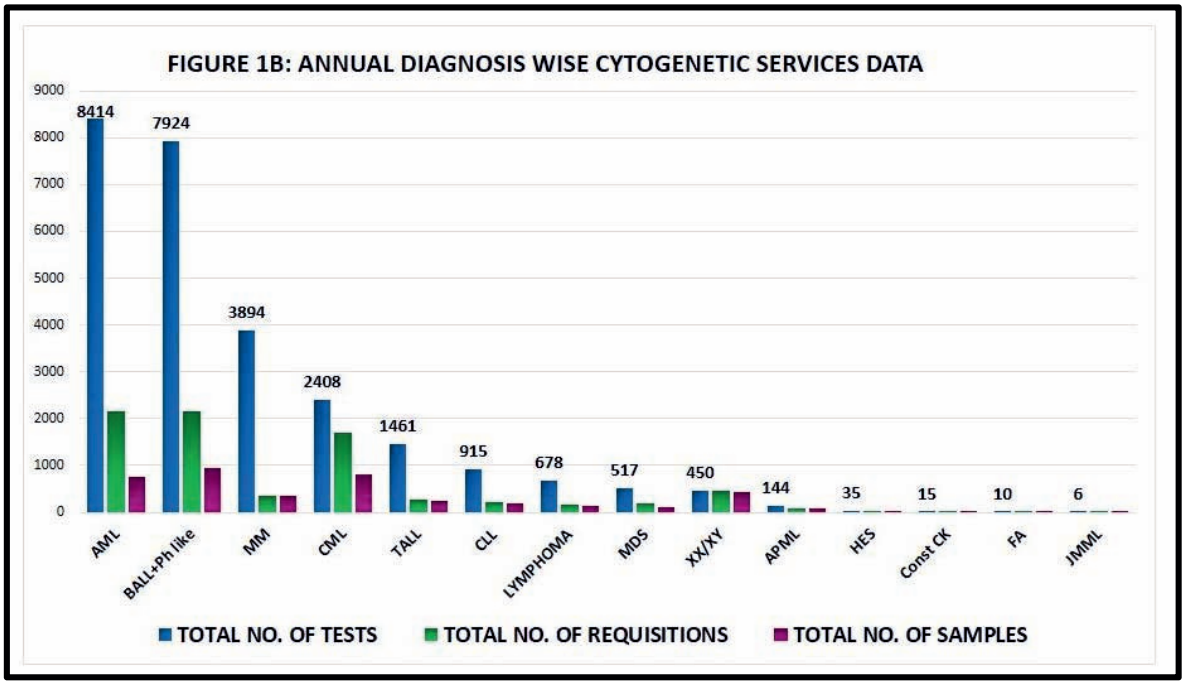
Overview

The Cancer Cytogenetics Department is an NABL accredited laboratory providing molecular Cytogenetics and conventional cytogenetic diagnostic services [Conventional Karyotyping (CK) and Fluorescence In-situ hybridization (FISH)] for hematolymphoid malignancies. The Dept. is well equipped with state of art technology and has developed comprehensive FISH panels for cytogenetic risk stratification and assessment of treatment response in leukemia, lymphoma and myeloma patients. The Department ensures quality of services by providing proficiency testing through External Quality Assessment (EQAS) program to leading cytogenetic laboratories in the country.

Service

The Cancer Cytogenetics Department received 4059 diagnostic samples, with 7786 requests for karyotyping and FISH testing (Figure 1A). The Dept. performed 26,871 tests including FISH panels for hematolymphoid malignancies (AML, APL, B-ALL, T-ALL, MDS, MPN, CML, CLL, Lymphoma and MM), chimerism studies in sex mismatch post-BMT patients; karyotyping, chromosomal breakage studies and ploidy assessment (Figure 1B). The Dept. successfully provided diagnostic services for samples received from HBCH (Varanasi) and BBCI (Guwahati). The Dept. participated in Inter-Laboratory Comparison Program (ILCP) and also provided proficiency testing services through the biannual EQAS Cytogenetics Program to seven cytogenetic laboratories in the country.





Research

In 2022, de-novo B-ALL patients were screened and genetically characterized B-Other ALL patients were recruited in the ICMR funded extramural ad-hoc project for deciphering the incidence and complete clinical, cytogenetic and molecular profile of the B-other ALL subgroup

in India. Retrospective studies were initiated to determine the role of copy number variations in B-ALL. The OIC co-edited and wrote a chapter in the book " Pedigree Charting and Inheritance: Essential for Genetic Counseling".

Education

The Dept. conducted the 3rd Annual Cytogenetics Workshop 2022 funded by ICMR-DHR to impart cytogenetic training to faculty and students from Govt. Medical colleges. The Department introduced the 2-year post-doctoral Cytogenetics fellowship program for PhD/MD students. The advanced cytogenetic training program (5 trainees) for MSc. students was successfully conducted. The Dept. participated in DMG meetings, joint clinics/multidisciplinary activities. The faculty was invited as a speaker in CME's and national conferences.

Clinical Pharmacology Laboratory

Officer-in-Charge: Dr. Vikram Gota

Scientific Officers: Dr. K. Manjunath Nookala

Dr. Kavita Pal

Overview

The clinical research efforts of this laboratory are aimed at developing new drugs for graft versus host disease (GVHD), acute lymphoblastic leukemia (ALL) and radioprotection. Important milestones of the year 2022 are the successful conduct of a phase 2 trial of chlorophyllin in hemorrhagic cystitis and the development of an age appropriate formulation of 6-mercaptopurine for children suffering from ALL. In addition, critical support and expertise necessary to conduct early-phase clinical trials in oncology is provided by the faculty, as well as training personnel and developing capacity in the field of cancer pharmacology, biostatistics and clinical research operations. This laboratory is also recognized as the ICMR Centre for Advanced Research and Excellence in Clinical Pharmacology (ICMR-CARE).

Service

This laboratory offers therapeutic drug monitoring (TDM) services for voriconazole, posaconazole, imatinib, mycophenolate mofetil and L-asparaginase. More than 3800 samples [Voriconazole (2146), Posaconazole (1592), MMF (15), L-asparaginase (09) and Imatinib (05), Sunitinib (74)] were reported for drug levels in 2022, benefitting more than 800 patients undergoing treatment for leukemias, BMT and other indications. Bioanalytical methods for the determination of 5-flurouracil (5-FU) and colistin were validated and the TDM service for these drugs will start in 2023.

Research

Notable contributions in the field of research include the demonstration of the utility of chlorophyllin for the treatment of radiation-induced hemorrhagic cystitis in a phase 2 clinical trial, conducted in collaboration with the department of uro-oncology. Besides, a liquid formulation of 6-mercaptopurine was developed in collaboration with a pharmaceutical

company which received marketing approval from the Drugs Controller General of India. The laboratory is collaborating with the EORTC for designing and validating quality of life questionnaires in various cancers. Three graduate students from the laboratory are involved in the development of drugs for lung cancer, GBM and graft-versus-host-disease respectively. The OIC was granted an US patent for the 'Use of 3,3'-Di-Seleno-Dipropionic Acid (DSePA) as an Anti-Cancer Agent' in collaboration with BARC.

Education

The OIC is a recognized guide for Ph.D. in Life Sciences under the Homi Bhabha National Institute, and four students- Ms. Dievya Gohil, Ms. Megha Garg, Mr. Saurabh Gupta, Mr. Girish Panigrahi, Ms. Aishwarya J and Ms. Amisha Joshi are presently working on their doctoral theses. The laboratory continues to offer Fellowship in Oncotherapeutics which attracted a number of applications in 2022. Four students of MSc Clinical Research interned from the laboratory in the report year.

Composite Laboratory

Officer-in-Charge: Dr. Preeti Chavan

Consultant: Dr. Avinash Pagdhune

Overview

The Composite Laboratory is NABL accredited and provides 24 hours' services to the hospital. The laboratory consists of three sections: sample collection area, haematology, and biochemistry (routine biochemistry and immunoassay). The laboratory also processes murine and canine blood samples for research purposes. The laboratory conducts a one year advanced training course in Medical Laboratory Technology since November 2015.

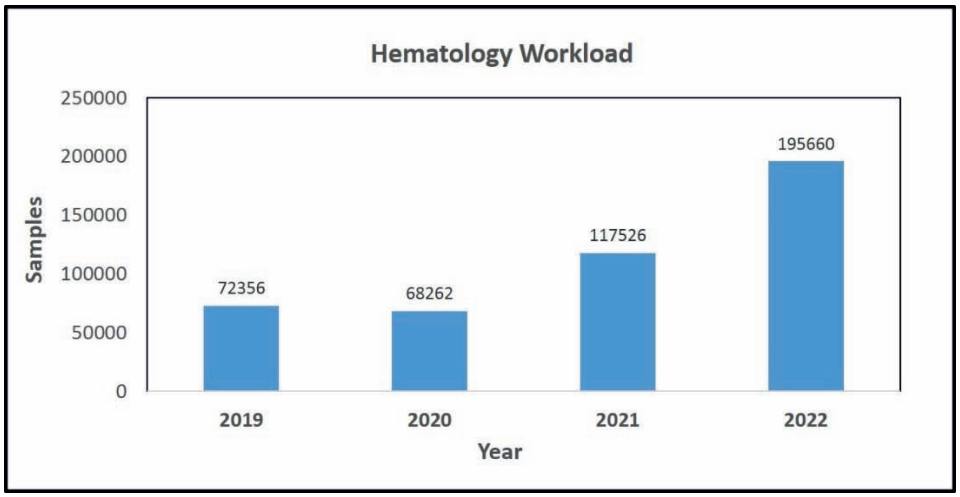
Service

The Composite Laboratory provides the following patient-related hospital services; routine hematology (CBC, coagulation and peripheral blood smear examination) and biochemistry (LFT, RFT, electrolytes, cardiac enzymes, osmolality, immunoglobulins, ferritin, tumor markers, assays for vitamin B12,vitamin D, folate, thyroid function tests, drug assays (Cyclosporine, Tacrolimus, Sirolimus and Methotrexate). The laboratory performed; 707840 tests for routine biochemistry and immunoassays, 195660 tests for hematology, during the period January to December 2022.

Research: Two international and two national research papers were published by the faculty in 2022. Four research projects are being conducted in the laboratory.

Education

One student enrolled for advanced training course in Medical Laboratory Technology.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Samples
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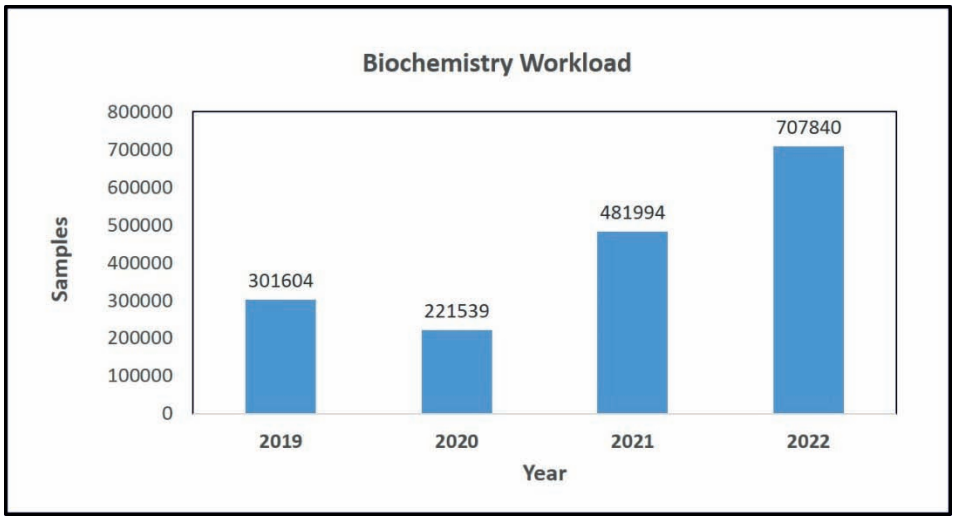
2020
2021
2022
Year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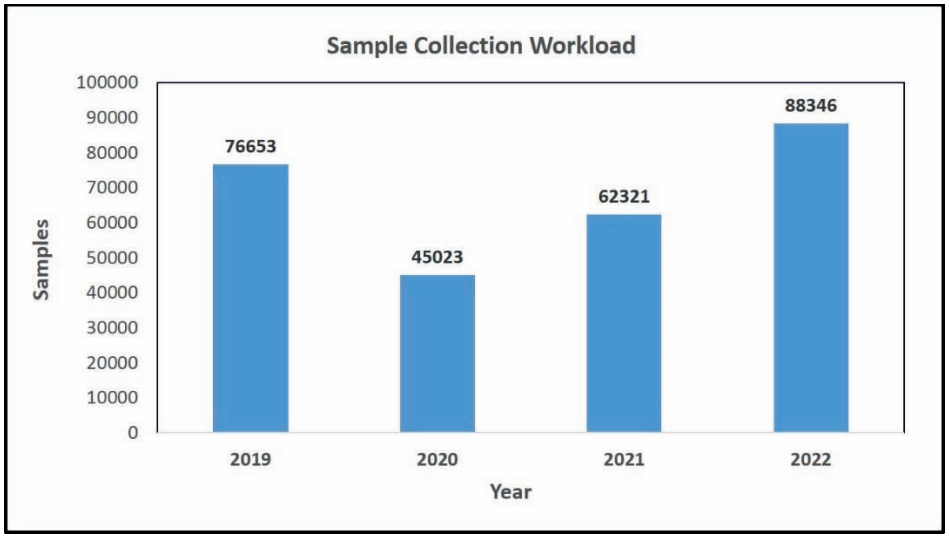
2021
2022
Year


Sample Collection Workload
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Samples
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2019
2020
2021
2022
Year

Clinician Scientist Laboratory

Clinicians: Dr. Sudeep Gupta, Dr. Rajendra Badwe, Dr. Shalaka Joshi, Dr. Seema Gulia

Overview

This Laboratory's primary goal is to understand the biological role of hypoxia in cancer metastasis & cancer spread, clonal evolution of a tumour leading to therapy resistance, and developing novel blood-based assays to monitor tumour burden and response to therapy.

Research

There are several varied studies on-going in this laboratory.

Clinical Research

Lignocaine, anaesthetic drug reduces metastasis after Breast Cancer surgery

Dr. Rajendra Badwe and team have demonstrated that a commonly used inexpensive local anaesthesia drug lignocaine is found to have increased cure rates and survival in breast cancer patients. The study included 1,600 women with early breast cancer who were planned to be treated with surgery. Half of these patients, constituting the control group, received standard surgery followed by standard post-operative treatment including chemotherapy, hormone therapy and radiotherapy as per guidelines. The other half, constituting the intervention group, received an injection of a commonly used local anaesthesia agent, 0.5% lidocaine, all around the tumour, just prior to surgery. They then underwent standard surgery followed by the same postoperative treatment as was given in the control group. The 6-year disease-free survival (cure rate) was 81.7% in the control group and 86.1% in the local anaesthesia group for a 26% relative reduction in the risk of cancer relapse or death with the local anaesthesia injection, which was statistically significant. Similarly, the 6-year overall survival was 86.2% versus 89.9% in the two groups for a 29% reduction in the risk of death with the local anaesthetic injection, which was also statistically significant. Further translational work to identify the mechanisms of lignocaine activity in the breast cancer, head and neck cancer and lung cancer is underway in the laboratory.

Carboplatin, a commonly available and inexpensive drug, increases cure rate and survival in triple-negative breast cancer (TNBC)

Dr. Sudeep Gupta and team have demonstrated that the addition of Carboplatin to Taxane/ Anthracycline neoadjuvant chemotherapy improved pathologic complete response rates, event-free survival, and overall survival in patients with triple-negative breast cancer, the most aggressive type of breast cancer. The study was a randomized controlled trial which enrolled women with stage II-III triple negative breast cancer. The group was further divided into two groups: Standard group, patients received standard chemotherapy comprised of once per week paclitaxel for 8 weeks followed by doxorubicin plus cyclophosphamide every 3 weeks for 4 cycles and Platinum group, women received the same chemotherapy with the addition of injection carboplatin once per week for 8 weeks, given with paclitaxel. Patients in both groups underwent surgery after the last cycle of chemotherapy followed by radiotherapy. Patients in the platinum group experienced an absolute 7.6% increase in overall survival at 5 years, based on rates of 66.8% in the standard group and 74.4% in the platinum group.

Basic Research

Role of Activator Protein 1 in surgery induced hypoxic stress

To probe the role of AP-1 in promoting aggressive tumor phenotype triggered by surgery induced hypoxic stress, gene expression studies were done with MCF7 and MDA-MB-231 cells after exposure to 0.1% and 1% oxygen concentrations for short (1h) and long time (24h and 48h). Concomitant with CA-9 and VEGF (hypoxia markers), AP-1 genes were highly expressed in hypoxic conditions compared to normoxia and normoxia followed by reoxygenation. Differential gene expression and protein expression of AP-1 mainly C-JUN, C-FOS, JUNB, JUND and FOSL1 was observed in culture condition tested. MTT was performed to assess the proliferation of this cell line in normoxia, hypoxia, and hypoxia followed by reoxygenation conditions. The proliferation of hypoxic cells was significantly reduced compared to normoxic cells, but hypoxia-pretreated cells have increased proliferation compared to corresponding normoxic cells. Similarly, results were also observed in a scratch assay where hypoxia pretreatment increased the collective migration of MDA-MB-231 and MCF-7 cells compared to normoxic cells. These results indicate that hypoxia pretreatment results in an aggressive phenotype characterized by increased proliferation and migration of these cells.

Proteogenomic characterization of Triple Negative Breast Cancer (TNBC) and Cervical Cancer

To compare DNA (whole genome/exome) profiles of TNBC tumors to that of tumors adjacent normal breast tissue/germline DNA will help identify structural variations, copy number changes and mutations specific to TNBC. Comparison of mRNA (whole transcriptome) profiles of TNBC tumors to that of tumor adjacent normal breast will help identify genes de-regulated in TNBC. Comparison of protein (whole proteomic) profiles of TNBC tumors to that of tumors adjacent normal breast will help identify proteins de- regulated in TNBC. These three data types will mimic the central dogma of molecular biology, and, Integration of data from these three assays i.e., DNA (Whole Genome/exome Sequencing), RNA (Whole Transcriptome Sequencing) and Protein (Whole Proteome) from the same patient tumors will unravel the molecular architecture of TNBC. This data will constitute a valuable resource to identify novel drivers of TNBC that can be probed for therapeutic vulnerabilities using functional genomic screens.

Translational Research

Indian Cancer Genome Atlas (ICGA)

The purpose of this study is to collect a variety of specimens from breast cancer patients and look for differences or similarities between the specimens in genetic and molecular characteristics. Collecting important clinical information and biospecimens (i.e., blood, breast cancer and non-cancer tissues) from breast cancer patients from all parts of India for further molecular analysis (Molecular analysis are done to study what changes in a gene or chromosome leads to development of a disease or disorder, such as cancer.) and for future research use (i.e., Bio banking).

Designing a Next Generation Sequencing (NGS) based diagnostic and prognostic assay utilizing circulating tumour DNA (ctDNA)

Next-generation sequencing (NGS) offers the sensitivity and specificity that researchers need to detect low levels of ctDNA in the bloodstream. In addition to targeting a single gene or a subset of genes, NGS can also identify genome-wide tumour-derived alterations in ctDNA. We have designed an NGS panel to sequence ctDNA. This panel of genes was generated based on

our assessment of the strength of available clinical evidence. This NGS panel is now undergoing validation in a prospective clinical trial.

Education

Prof. (Dr.) Sudeep Gupta is a recognized guide for DM, DNB and PhD (Health Sciences) of the Homi Bhabha National Institute. Presently, four students (Dr. Deep Vora, Dr. Aditya Dhanawat, Dr. Prashant Kumar and Dr. Shah Anjali Kirti) are being mentored for DM, and two students (Mr. Nilesh Gardi and Mr. Jinesh Maniar) are working on their PhD doctoral thesis. Besides students (Ms. Elizabeth Talker and Ms. Jaya Chitra) from the Mahatma Gandhi Mission (MGM) Institute and (Ms. Shashwati Parihari and Ms. Amrita Mukherjee) from the Indian Institute of Technology, Bombay (IIT-B) are being co-mentored for their PhD thesis. The laboratory trained three Master's dissertation students (Ms. Riddhi Ursekar, Ms. Anushree Kadam and Ms. Suhani Sale) and two summer trainees (Ms. Ankita Singh and Ms. Pranali Dhas) in the report year.

Hematopathology Laboratory

Officer-in-Charge:	Dr. P.G. Subramanian
Haematopathologist:	Dr. Sumeet Gujral
Clinician Scientists:	Dr. Nikhil Patkar, Dr. Prashant Tembhare, Dr. Gaurav Chatterjee, Dr. Sweta Rajpal
Scientific Officers:	Dr. Shruti Choudhary, Mrs. Swapnali Joshi

Overview

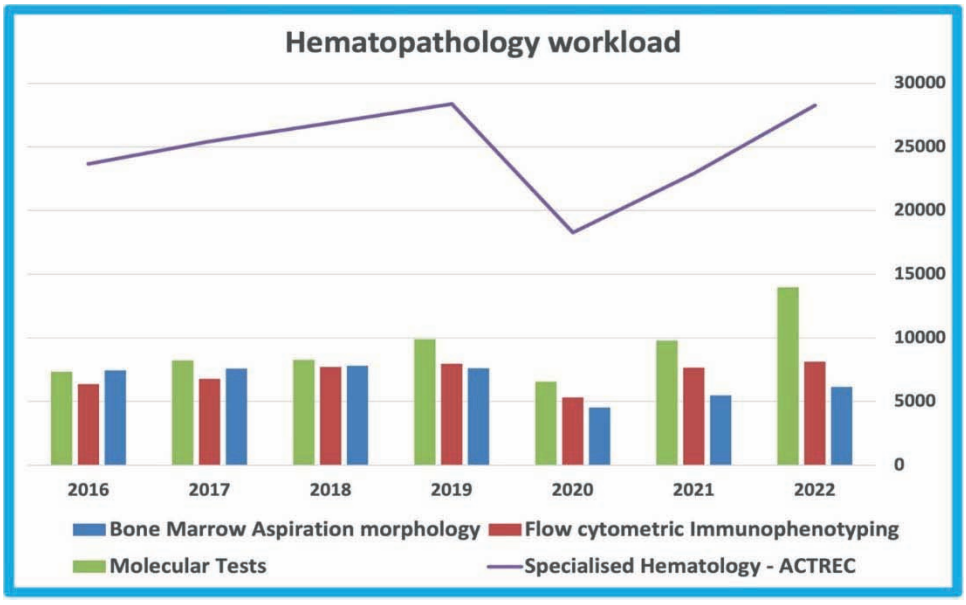
Hematopathology Laboratory is a service laboratory at ACTREC does the diagnosis and sub classification of hematological malignancies as well as monitoring of patients while on therapy for all malignancies. The laboratory uses morphology, Flow cytometry and Molecular techniques for diagnosis. The laboratory does Minimal residual disease testing and post treatment monitoring of patients of Chronic Myeloid Leukemia, B cell Acute Lymphoblastic leukemia in children, T cell Acute Lymphoblastic Leukemia, Acute Myeloid leukemia and Multiple Myeloma. These tests are used to tailor the treatment for individual patient based on response to initial treatment.

Service

The laboratory tests blood, bone marrow and body fluids for diagnosing leukemia and lymphoma. The laboratory does sensitive investigations like detection of Minimal residual disease for Acute Leukemia and Multiple Myeloma and involvement of hematolymphoid malignancies in cerebrospinal fluid and other rare sites. The laboratory does post allogenic stem cell transplant monitoring for chimerism by analyzing Short Tandem Repeats. The laboratory does extended immune subset monitoring for both post allogenic stem cell transplant and for patients affected with Covid 19. The laboratory has established IL-6 and other interleukin assays required for diagnosing and monitoring cytokine storms.

The following are the total number of tests done in this laboratory in the year 2022.

	Name of the Tests	Total No. of Tests performed
1.	**Bone Marrow Aspiration Smears**	**6154**
2.	**Cytochemistry**	**3562**
3.	**Flow cytometric Immunophenotyping**	**8128**
	Extended Immune subset monitoring	956
4.	**Body Fluids for cell counts & Morphology**	**2447**
5.	**Molecular Hematopathology**	**13977**
	Chronic Myeloid Leukemia monitoring by BCR-ABL1 Quantitation	5637
	BCR-ABL1 and other Leukemia Transcript identification	440
	ABL Kinase Domain Mutation studies	8
	Acute Promyelocytic Leukemia PML-RARA Quantitation	339
	IGH or TCR gene for clonality and other tests	11
	Chimerism testing by STR markers for Bone Marrow transplantation	1798
	MYD 88	9
	Next Generation Sequencing Assay	1674
	RNA Sequencing Assay	917
	NGS Comprehensive	1
	NPM1 MRD	5
6.	**Testing for SarsCov2**	**3138**



Research

The following research projects have major involvement of the laboratory: Immunological profile and predictors of severity in Covid 19;Sequencing of SarsCov2 virus in cohort of patients at ACTREC; Minimal residual disease (MRD) in both B cell and T cell Acute Lymphoblastic Leukemia and its predictive value in outcome; Minimal Residual Disease in Acute Myeloid leukemia using both Flow Cytometry Techniques and Next generation

sequencing and its value in Clinical management in Indian context; Gene mutations in Acute Myeloid Leukemia and use of Artificial Intelligence algorithms for better risk stratification for management; Detection of Minimal Disseminated disease in Pediatric round cell tumors by flow cytometric immunophenotyping; Investigating value of circulating plasma cells and serum miRNA levels for therapeutic response evaluation in newly diagnosed multiple myeloma; Immune reconstitution post allogenic stem cell transplant.

Education

The laboratory conducts the following courses: Immunophenotyping – Bench to Clinic, Course for Technician – One course every year; Immunophenotyping – Bench to Clinic, Course for Pathologists – One course every year; Hematopathology fellowship program. It is 2 year post MD training program in hematopathology; 6 months Advanced Training Program for pathologists in oncology. – 2 trainees; Advanced Training courses for technologists in
Flow cytometry – 3 trainee and Molecular Hematology – 3 trainee
In addition the laboratory trains and shares its knowledge and expertise to medical community in other parts of India. Fifty M.D. Pathologists from various parts of the country came as observers for training in Morphology, Cytochemistry and Flow cytometry.

The laboratory has also actively run free online program for teaching of resident pathologists during the Lockdown period in India in collaboration with Tata Trust. The program saw participation from more than 25 countries and attendance by more than 1500 delegates.

Medical Administration

Medical Superintendent: Dr. Prashant Bhat

Assistant Medical Superintendent: Dr. Puneeth Thattikonda

Manager, Medical Services: Dr. Minal Poojary

General Medicine: Dr. Prafulla Parikh, Dr. Sujit Kamtalwar, Dr. Ashwini More

Staff Physician: Dr. Amar Patil

Quality Manager & COVID Vigilance Officer: Ms. Chital Naresh

Medical Social Worker: Ms. Bhagyashree Tilu

Physiotherapy: Dr. Mohua Chatterjee, Dr. Supriya Nakhate

Medical Records Officer: Mr. Madhumohan Maddirala

CSSD (In Charge): Mr. Sachin Walawalkar

Biomedical Engineering (In Charge): Mr. Shine Kumar

Surgical Purchase (Jr. Purchase Officer): Ms. Roshni D'mello

Surgical Stores (Asst. Admin Officer): Mr. Shanoj Shanmughan

Medical Stores (Sr. Pharmacist): Mr. N V Chavan/ Mr. Sunil Gopal

Pharmacy (Sr. Pharmacist): Mr. K N Chaudhari

Overview

The outpatient, inpatient, diagnostics, clinical, and support services together with patient hostel Asha Nivas are managed by Medical Administration headed by the Medical Superintendent. The General Medicine for the management of medical co-morbidities, Staff Clinic, and super-specialty consultation through honorary specialists is organized by the Medical Administration. Associated clinical services viz. dietetics and patient nutrition, physiotherapy, Patient support services through medical social work, and Medical Records are managed by the Office of Medical Superintendent. Pharmacy along with material management of drugs and surgical supplies, procurement of capital equipment for CRC, healthcare government schemes MJPJAY and AYUSHMAN BHARAT implementation at ACTREC is facilitated by Medical Administration. MS Office is actively involved in the various infrastructure projects under progress at ACTREC. CSR funding for poor patient treatment support, infrastructure development, equipment donation, and small and large monetary

donation to various patient welfare funds are liaised and coordinated from the MS office. Patient activities organized by NGOs and voluntary organizations are also facilitated by Medical administration.

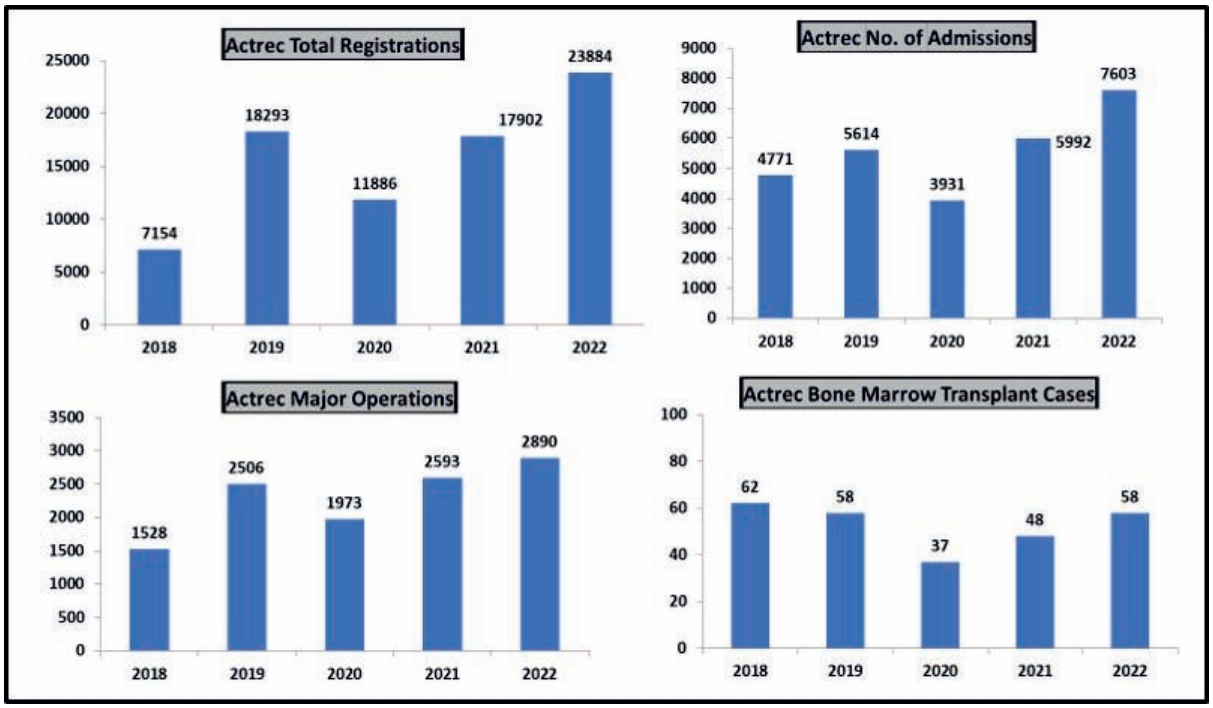
Service

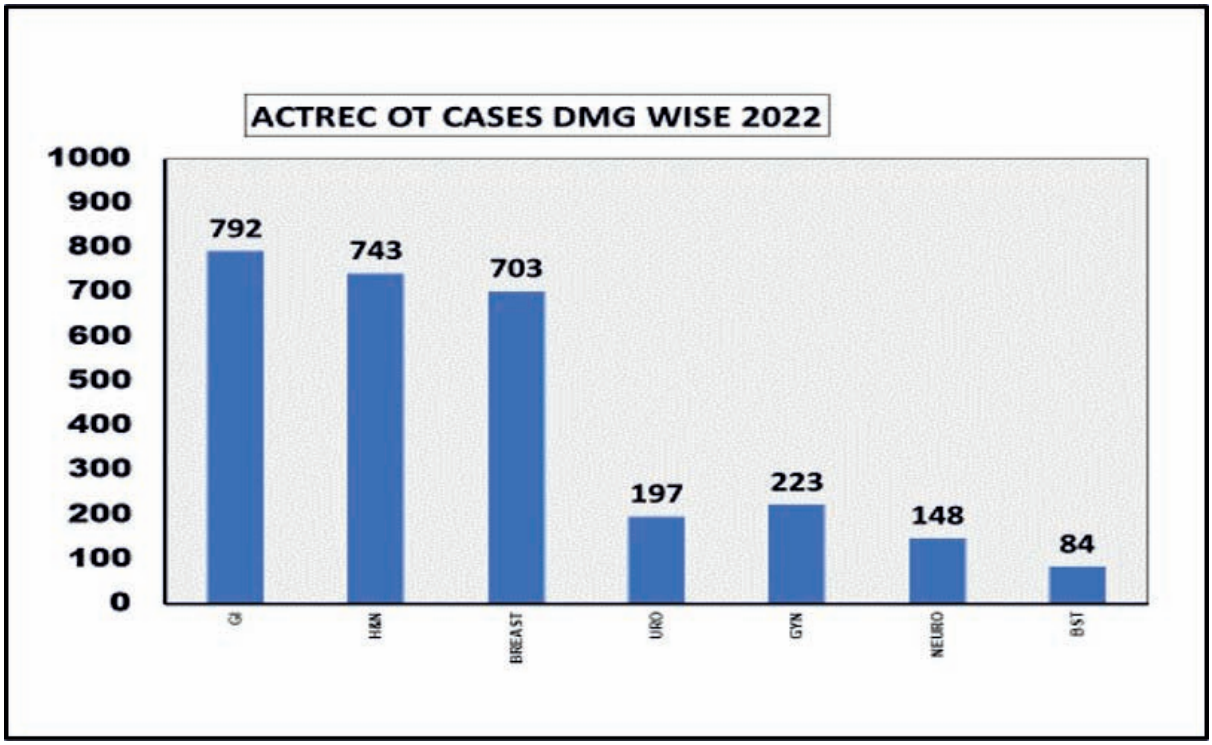
The aim in 2022 was to compensate for delays in patient care services that occurred in 2020-21 due to the global COVID pandemic. Medical Administration invigorated the patient care projects at ACTREC delayed due to the COVID crisis. It has led to the foundation brick-laying ceremony of Sanghvi Block (Shantilal Sanghvi Pediatric Hematolymphoid Cancer Centre), the inauguration of Chemotherapy and Pulmonary Function Test Units at RRS, the successful installation of an indigenously built FDM 3D Printer, procurement of the Maruti Eco Food Van, TATA Intra V30 for on-campus material transportation, the launch of Patients' Electronic Medical Records (EMR) App, the inauguration of Agilent Tape Station 420, new Modular Operation Theatres, observed National Nutrition week and Poshan Abhiyaan.

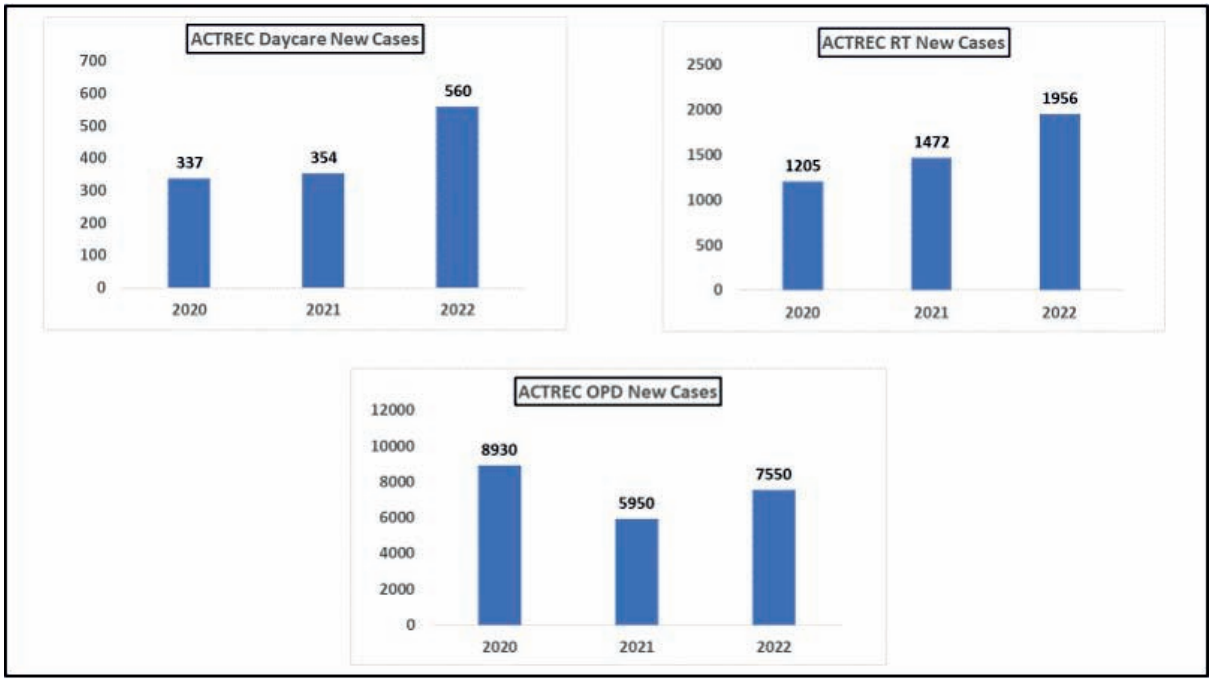
The ACTREC Diagnostic Laboratories appeared for NABL re-assessment and were granted continued accreditation with validity until 19th May 2024.

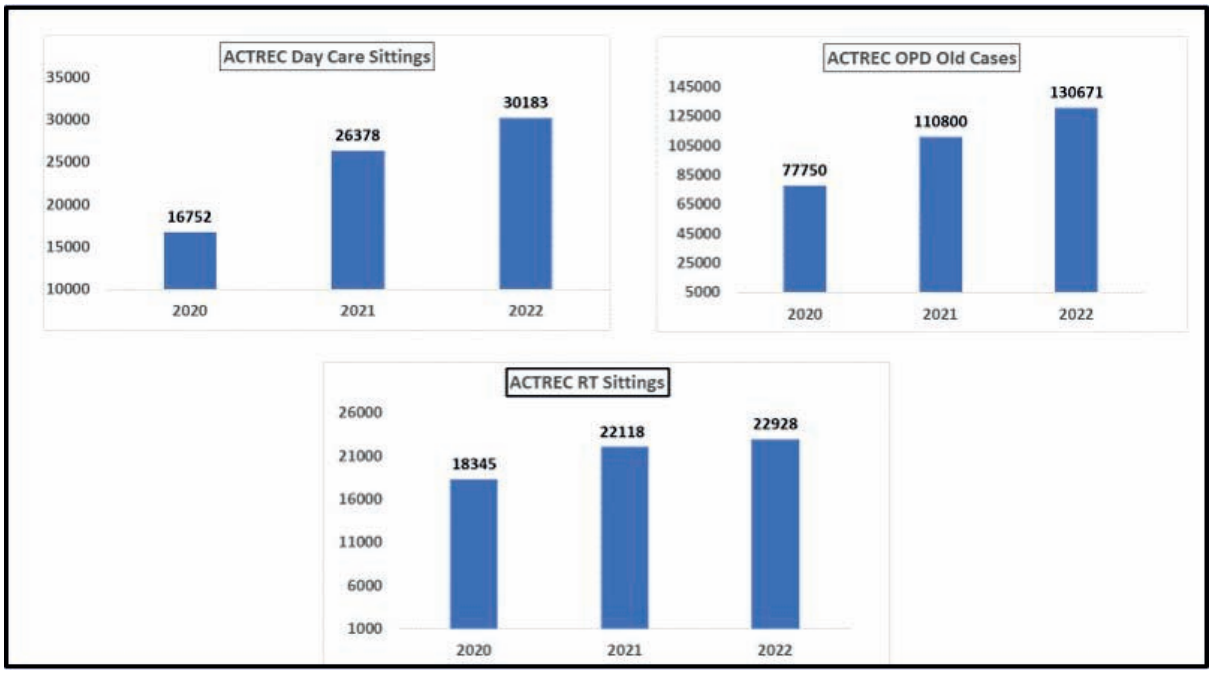
The year 2022 has seen 2818 new ACTREC registrations, 21066 transfer cases from TMH, and 2657 referrals for diagnostic and 371 expert opinions. 560 new patients have used Daycare services. Radiotherapy new referrals were 1956, and 1860 patients have undergone Interventional radiology (IR) procedures.

During the year we have carried out 2890 major surgeries and 582 minor surgeries in 14 Operation theatres. 141500 patients were seen at the OPD at ACTREC. 3568 blood donations and 1314 apheresis were conducted in the Department of Transfusion Medicine. A total of 230548 samples were received for investigations at various diagnostic facilities viz—Biochemistry, Hemato-oncology, Flow Cytometry & Molecular Hematopathology, Microbiology, Surgical Pathology, Cancer Cytogenetics, and Transplant Immunology & Immunogenetics lab.


Actrec Total Registrations
25000
20000
15000
10000
5000
0
7154
18293
11886
17902
23884
2018
2019
2020
2021
2022
Actrec No. of Admissions
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
4771
5614
3931
5992
7603
2018
2019
2020
2021
2022
Actrec Major Operations
3500
3000
2500
2000
1500
1000
500
0
1528
2506
1973
2593
2890
2018
2019
2020
2021
2022
Actrec Bone Marrow Transplant Cases
100
80
60
40
20
0
62
58
37
48
58
2018
2019
2020
2021
2022


ACTREC OT CASES DMG WISE 2022
1000
900
800
700
600
500
400
300
200
100
0
792
743
703
197
223
148
84
GI
H&N
BREAST
URO
GYN
NEURO
BST





Infrastructure Projects

Medical Administration closely interacted with Engineering, General Administration, Contractors, and Vendors in the commissioning of Raja Rao Shodhika: which included the commissioning of wards, Daycare, ICU, and Post-operative recovery wards and 13 Operation Theatres. It also encompassed procurement and installation of equipment and furniture,

coordination of construction, validation of modular Operation Theatre (OT) and ICU and validation and activation of CSSD; is associated with the coordination of equipment purchases for the Radiation Research unit (RRU). It is currently working towards commissioning RRU in a phased manner; is also involved in the planning and renovation of the existing old patient hostel 'Vasundhara' to an OPD block. Medical administration facilitated and coordinated with the Proton therapy team and the vendor for the smooth execution of the protocols which will culminate in submission to AERB for approval.

Future Plans

The Department in the near future will be working towards commissioning: of the OPD block which is currently under renovation; the Proton therapy center for patient service; the Radiation Research Unit including procurement and installation of major equipment and will continue preparation for accreditation of the facility.

Medical Oncology Department

Officer-in-Charge: Dr. Amit Joshi

Medical Oncologists: Dr. Sudeep Gupta, Dr. Navin Khattry, Dr. Jaya Ghosh, Dr. Anant Gokarn, Dr. Sachin Punatar, Dr. Sumeet Mirgh, Dr. Ankansha Chichara, Dr. Nishant Jindal, Dr. Srikanth Anne, Dr. Anbarasan Sekar.

Overview

The Department of Medical Oncology started its services in ACTREC in 2006. The Bone Marrow Transplant unit shifted to ACTREC in November 2007; since then, 887 autologous/ allogeneic transplants have been performed with an overall transplant-related mortality of 10% (2% in autologous, 18% in allogeneic). CAR-T cell therapy for refractory acute lymphoblastic leukaemia was initiated in 2021, and six patients have been treated since.

Service

Bone Marrow Transplantation and Adult Haematolymphoid Unit: In 2022, 42 allogeneic and 55 autologous patients were admitted in 6 bed HEPA filtered BMT unit and in newly expanded four bedded autologous BMT services in the Raja Rao Shodhika building. In-patient services were provided to 205 patients for post-transplant complications during the report year. In the report year, for the BMT and adult haematolymphoid OPD, 14,295 outpatient visits took place in BMT and adult haematolymphoid unit, and 250 new files (non-TMH) were registered, while 324 new referrals from TMH were examined. There were 644 in-patient admissions in the haematolymphoid ward, and step down non HEPA filtered the second floor BMT ward for chemotherapy or supportive care administration. There were 80 PBSC collections. Six patients were treated with CAR-T infusion in 2022. The unit routinely performs matched unrelated donor transplants using HLA-matched stem cells from international/national unrelated donor registries and the most challenging - haploidentical transplants for patients who do not have a fully matched related/ unrelated donor.

Adult Solid Tumour Unit: In the year 2022, 26,186 outpatient visits took place in this OPD and tumours of the breast, head and neck, ovary, testicular, and cervix region comprised the bulk of cancers. There is a significant footfall of patients with germ cell tumours of the ovary and testes. Total 3644 patients availed in patient services for prolonged chemotherapy infusions

and supportive and palliative care. The Chemo Day-care has seen an expansion from the previously existing 13 beds to 39 beds since August 2022, which has resulted in 30,183 infusions. A total of 1512 OPD procedures, like ascitic and pleural tapping, bone marrow aspiration and biopsies, and intrathecal methotrexate, were performed in the procedure room. In a recently established casualty unit, patients from all departments have availed of integrated 24-hour emergency facilities.

Paediatric Oncology Unit: The new 16 bedded Paediatric Oncology ward was inaugurated in Raja S Rao Shodhika building on July 30th 2022. In the paediatric oncology OPD and inpatient services, 5892 outpatient visits took place in 2022, and about 2231 inpatient admission were admitted.

Research

Faculty members of the department are involved in several investigator-initiated and sponsored clinical trials and collaborative research projects, both in the haematolymphoid and solid tumour units. There has been a thrust on doing clinically relevant research with medicinal plants, and a few ongoing projects use curcumin, resveratrol-copper, and ashwagandha. Also, there is an immense thrust to establish a robust cellular therapy programme both for CAR-T cell therapy and non-CAR-T Cell therapies.

Education

The department of Medical Oncology at ACTREC has an active educational program, which encompasses daily academic sessions on transplantation, haematolymphoid and solid tumour neoplasms for the DM students posted in ACTREC, and a monthly Journal Club that includes faculty and students from the departments.

Microbiology Laboratory

Officer-in-Charge: Dr. Vivek Bhat

Scientific Officer 'E': Dr. Sujata Lall

Overview

The Microbiology Laboratory is involved in patient service, academics and research. Patient services include processing and reporting of bacteriology, serology, mycobacteriology, molecular diagnostics, mycology and other clinical microbiological samples at ACTREC. Sterility testing for Blood Bank services, environmental surveillance, infection control guidance and waste management support is also provided by the laboratory. The department staff is also involved in research projects and scientific publications. Educational activities include teaching (TMC & other institution) postgraduate students in microbiology, nursing department, TMC laboratory staff & Advanced Training Course in Medical Laboratory Technology (ATMLT) course.

Service

The Microbiology Laboratory provided the following patient related & hospital services at ACTREC. A total of 27,686 clinical samples were processed in the laboratory for the period January – December 2022. These includes Bacteriology cultures for Blood (5934), CSF/Body fluids (201), Drain Fluids (385), Pus (80), urine (1144), feces (1343), swabs (1101), Respiratory samples (234) & others (260). Serology: HBsAg (2800), HIV (2701), HCV (2767), HBCT (528), HBCM (485), PCT (1350), Dengue (799) & others (1384); Molecular Microbiology- Syndromic multiplex PCR testing: Respiratory Panel (152), Blood Culture Identification (64), Meningitis/ Encephalitis Panel (33), Pneumonia Panel (9), Gastrointestinal panel (53);

Clinical Microbiology testing for urine (1886), faeces (774), Clostridium difficile (547) & Adeno/ Noro / Astro/ Rota virus antigen detection (413), Mycobacteriology (Acid Fast Staining) (79), Mycology (179) (Identification of fungi in clinical material and susceptibility testing and special staining, Routine Fungal Culture). Sterility testing for Blood Bank services: PBSC (184), SDP (1285), RDP (44), PCS (1023), Fresh frozen plasma (53), others (25) &

environmental surveillances for OT/ ICU/ Brachytherapy/ BMT units/CCE & others as requested. Infection control guidance and waste management support is also provided by this Department.

Research

The Department is involved in four ongoing research projects that have been approved by the IEC. Research areas include testing for susceptibility profiles and resistance patterns of multidrug resistant pathogenic microorganisms commonly found in hospital patients to newer antibacterials such as ceftazidime- avibactam, levonadifloxacin and ceftaroline fosamil. Preliminary data indicate good in-vitro effectiveness of ceftaroline and levonadifloxacin against staphylococcus aureus and of ceftazidime- avibactam in some MDR Gram negative infections.

Five scientific publications in peer-reviewed journals were authored/co-authored by staff members of this departmental in the report year.

Education

This Department is involved in teaching post-graduate students of microbiology, laboratory staff, nursing and housekeeping staff and also project/ dissertations/internship for MSc/B. Tech students from other institutes. The ATMLT (Advanced training course in Medical Laboratory Technology) is also conducted and coordinated by the department of microbiology and composite laboratory. The Department staff participated in six National/ International Conferences /workshops during the report year.

Nursing Department

Deputy Nursing Superintendent:	Dr. Meera Achrekar
Assistant Nursing Superintendent:	Anjali Rawat
Assistant Manager Nursing Services:	Ms Pallavi Meshram

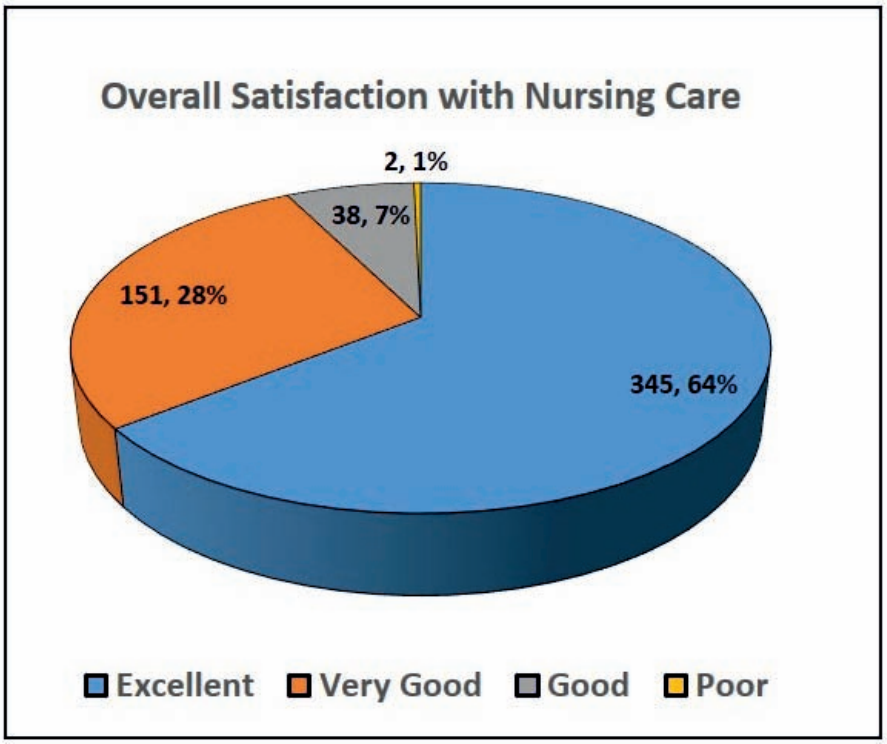
Overview

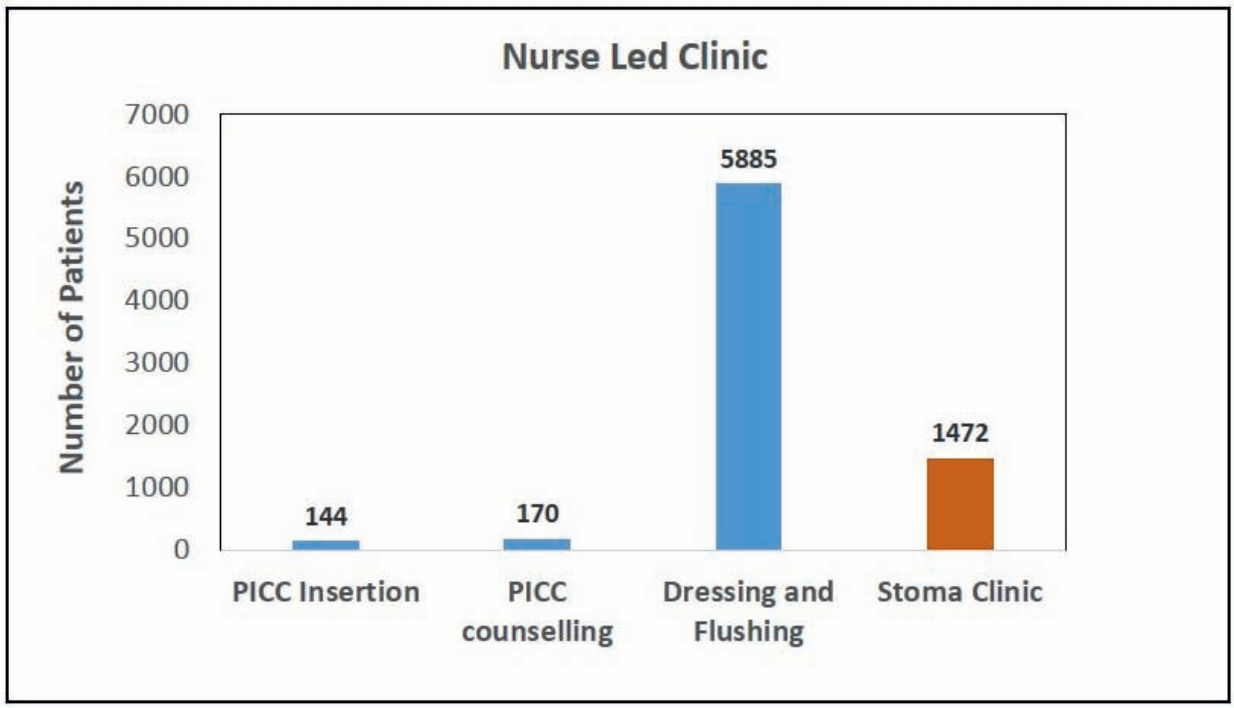
The Nursing Department at ACTREC, constantly strives to provide safe environment and positive experience to patients/caregivers. The Nursing Department has initiated its journey towards Nursing Excellence certification. In 2022 all nursing efforts and attention were focused on expansion of nursing activities to the newly initiated Raja Rao Shodhika block. This Department and its staff are also committed and focused on bridging the gap between theory and practice through the continuing nursing education program. All new joiners underwent a week's induction program. Various audits were undertaken to ensure quality care and compliance to protocols. The BMT unit has completed 15 years at ACTREC. Two students enrolled for one-year fellowship program in Bone Marrow Transplant Nursing. Nurse led CVAD and Stoma clinics provided focused care to patients. The Questionnaire on overall satisfaction with nursing care handed over to patients, threw back a response with 92% patients opting for, 'very good' and above. A proud moment for the Nursing Department was the selection of Mr. Amish Kale for recipient of "Rising Star Award" by Global Power of Oncology Nursing (GPON). Several nurses won awards for competitions held in ACTREC.

Service

In 2022 all nursing efforts and attention were towards commissioning of new solid tumor block named as Raja S Rao Shodhika. With the addition of this building a total of 270 patient care beds have been added to the ACTREC bed strength. Total of 87 permanent employees joined nursing services at ACTREC. All SOPs were finalized and will be placed on hospital intranet for easy reference. Also, emphasis was on promoting continuous quality improvement and continuing in-service nursing education. Continuous monitoring and follow up helped maintain pressure ulcer rate below 2 % (0.36% for 2022). Day care services were increased from 13 to 39 beds and new admissions to day care were 560 with a total of 30183 sittings. 582 minor OT procedures and 2890 major surgeries were undertaken. Fifty eight patients

underwent hematopoietic stem cell transplant: [42 - autologous, 16 allogeneic (includes 6 haploidentical and 3 matched unrelated donor)] and 4 CAR-T transplants. Complications were handled with expert medical and nursing care. The overall satisfaction with nursing care showed, around 92% of patients expressed, 'very good' and above. In Central Venous Access Device (CVAD) clinic, 144 Peripherally Inserted Central Catheters (PICC) were inserted, 170 patients were given counselling and 5885 dressing and flushing were performed. Complications like site rash, fractures, thrombosis were resolved by the specialized CVAD nurses. 1472 patients undergoing GI surgeries attended the stoma clinic and complications like peri-stomal skin excoriation, high output stoma, stoma retraction were resolved by our specialized stoma care nurses.





Research

Various audits on nursing assessment, nursing documentation, thrombophlebitis, pain management, hand hygiene were carried out. SSI, CLABSI, CAUTI and VAP surveillance helped to assess rate of these infections in this hospital setting.

Education

Many sessions of induction programs and vigorous trainings were carried out for new joiners. A one week induction program is conducted for all new joining staff. Exclusive hand on CPR sessions were also arranged to manage code blue situations. Personality development programs like “Abhilasha” were attended by nurses. Virtual conference by ISBMT and APBMT were also organized. Nurses underwent training courses like stoma specialist nurse (2), CVAD (1), infection control program (1). One nurse was deputed for MSc nursing.

Surgical Pathology Laboratory

Head of the department: Dr Sangeeta Desai

Officer-in-Charge: Dr Sridhar Epari

Staff Pathologists: Dr. Asawari Patil (ACTREC), Dr. Swapnil Rane (ACTREC), Dr Subash Yadav (ACTREC), Dr Katha Kante (ACTREC), Dr Tanuja Shet (TMH), Dr Sumeet Gujral (TMH), Dr Mukta Ramadwar (TMH), Dr Kedar Deodhar (TMH), Dr Bharat Rekhi (TMH), Dr Santosh Menon (TMH), Dr Munita Bal (TMH), Dr Rajiv Kaushal (TMH), Dr Ayushi Sahay (TMH), Dr Neha Mittal (TMH), Dr Uma Sakhdeo (TMH), Dr Poonam Panjwani (TMH), Dr. Trupti Pai (TMH), Dr Aekta Shah (TMH), Dr Gauri Deshpande (TMH) and Dr Nupur Karnik

Overview

The Surgical pathology laboratory at ACTREC is a part of the Department of Pathology, TMC, and all the pathology consultants and resident doctors work on rotation at TMH as well as ACTREC. At any given time, the ACTREC lab has one pathology consultant, four residents (senior residents and junior residents; all by rotation).

Service

The Surgical pathology laboratory provides diagnostic services for histopathology, frozen section and immunohistochemistry for patients treated at ACTREC as well as for referral cases from outside hospitals. The laboratory is equipped with automated tissue processors, automated stainer, cryostat and two automated immunostainers. This laboratory is accredited by NABL for all services and participates in EQAS (External Quality Assessment Scheme) offered by national agency (Anand Lab, Bangalore) and an International agency (College of American Pathologists). The processing of fine needle aspiration cytology (FNAC) samples from ACTREC are processed, and reported in the laboratory.

In the year 2022, the laboratory processed around 6048 histopathology specimens (i.e. 86277 paraffin blocks) and 3181 frozen sections on 1424 cases. In this year, the laboratory has standardized additional 13 antibodies – amounting to a total of 79 standardized antibodies IHC panel and performed around 12034 IHC tests in 4,102 cases. In respect to cytology, the laboratory processed 505 FNAC sampled and 400 fluid/exfoliative samples

Research

The laboratory archives all the slides and blocks and when required, retrieves and issues them for approved projects of pathologists, clinicians and scientists. The pathologists are involved as principal investigator or co-investigator in many IEC approved DMG projects, junior residents (MD students) thesis projects, as well as projects in collaborations with scientists in ACTREC.

Education

Pathologists at Tata Memorial Hospital and ACTREC participate in DMG (Disease Management Group) meetings, joint clinics/multidisciplinary meetings and virtual tumor boards regularly.

They also participate in national/international conferences as expert faculty or for oral/poster presentations. Resident doctors are encouraged to participate in conferences for oral/poster presentations and continuing medical education (CME) programs. The technical staff is also encouraged to participate in conferences, workshops as well as internal audit course for NABL.

Radiobiology Laboratory

Radiation Oncologists: Dr. Jayant Sastri Goda
Dr. Supriya Sastri
Dr. Sangeeta Kakoti

Overview

The Radiobiology Laboratory is working on various aspects of radiation biology and cancer therapeutics in collaboration with ACTREC basic scientists, oncologists and institutes like IIT Mumbai, BARC, Manipal & Yenepoya University. This laboratory is working in the field of developing newer formulations of radiation modifiers, besides repositioning drugs for radiation modification and is actively conducting translational aspects of clinical trials. Recently, work on cellular therapy using CART cells in glioblastoma in collaboration with IIT Mumbai has been initiated.

Research

The scientific investigations performed in this laboratory, in the area of radiation sensitization and protection, has led to the development and verification of the bio efficacy and bio distribution of novel nano formulations incorporated chemotherapeutic agents. These novel formulations examined for biological efficacy are liposomal gel combination of paclitaxel and cisplatin for loco regional delivery of the chemotherapeutic drug, data published in high impact factor journals (Journal of Controlled Release: IF 9.8; Nanoscale, IF: 7.8). A novel selenium compound (3-3 DSePA) as a lung radio protector against radiation pneumonitis has been developed and will be tested in humans as a phase-I /II clinical trial. The above project has been granted a BIRAC ETA Grant of 2 crores. This laboratory in collaboration with Manipal University is co-developing a Dual Drug Loaded Liposomal Nano vectors Targeting Integrin α6: A Glioblastoma Stem Cell marker in Intracerebral Orthotropic Xenografts of glioma. In collaboration with IIT Mumbai, the laboratory is co-developing a liposomal formulation of temozolamide for intranasal delivery of temozolamide. The laboratory has co developed an active plant extract called lupeol which is an antiangiogenic agent as a radiation sensitizer in orthotopic GBM models. The results of the study have now been applied as a product patent and communicated to a peer reviewed journal. The above project received a BRNS grant. This

laboratory along with the department of Pathology is the coordinating lab for international translational research study, BIOEMBRACE. This study is investigating impact of various biomarkers on outcomes of locally advanced cervix cancer (Dr Supriya Sastri, co-lead of the project). The laboratory is actively involved in preclinical development of multifunctional CAR-T cell therapy in GBM in collaboration with IIT Mumbai. Presently, the laboratory has grants from BRNS and DBT and BIRAC. The CART cell project received a DBT grant recently.

Education

The faculty associated with this laboratory actively train students in molecular biology pertaining to Radiobiology. Four students; 3 (MSc) and 1 (B Tech dissertation) were trained in this laboratory in the report year. This faculty of this laboratory were granted 3 patents in collaboration with other investigators and 1 Indian patent was filed for the novel antiangiogenic compound (Lupeol) in the report year.

Radiodiagnosis and Interventional Radiology Department

Officer-in-Charge: Dr. Amit Kumar Janu

Medical Officers: Dr. Kajari Bhattacharya, Dr. Nivedita Chakraborty

Dr. Soujanya Mynalli, Dr. Himangi Unde

Overview

Radiography, ultrasonography (USG), colour Doppler, computed tomography (CT), magnetic resonance imaging (MRI), mammography (MG) with digital breast Tomosynthesis (DBT), and interventional radiology are all available and radiological services are offered round-the-clock in this Department. A new 128 slice CT scanner (Incisive CT scan, Philips) that enables procedures using a CT fluoroscopy monitor has been added in 2022, which will reduce the waiting for both diagnostic scans and interventional procedures. The CT scan system can do coronary angiography, brain perfusion, virtual bronchoscopy, CT colonoscopy, vessel analysis, calcium scoring, and lung nodule detection. Interventional Radiology (IR) has added potable OT lights for improved visibility during procedures. The CT scan begins at 7:30 am, providing emergency imaging 24 hours a day in addition to routine imaging for cases. The Proton Center now has a brand-new, cutting-edge MRI (Signa, Artist, GE healthcare) installed for doing cutting-edge research and state- of- art imaging. Existing 3 T MRI machine is used for scans under anesthesia apart from routine cases. To maximize machine time slots, all of these services are extended to patients registered at TMH, in addition to ACTREC. Mammograms are done routinely as follow-up, diagnostic, and preventive procedures. Fluoroscopic or sonographic guiding is used for invasive diagnostic and therapeutic treatments. To determine the efficacy and adequacy of samples obtained under image guidance with a specific IR-OPD for the management of these patients, the on-site cytopathological investigation has been initiated. In addition to this, animal USG and CT scans are also performed as part of authorized animal research studies. Three senior and nine junior registrars from TMC are posted on rotation in addition to the normal paramedical staff to support these initiatives taken by this Department. The department's residential doctors are the senior and junior registrars in radio-diagnosis and interventional radiology (IR).

Service

A total of 3385 radiographic investigations (282 X-rays on average per month), 4173 USG/ Color Doppler (375 scans on average per month), 8158 Diagnostic CT scans (600 scans on average per month), 4310 MRI (360 patients on average per month), and 2506 MGs (208 patients on average per month) were completed in 2022. Additionally, IR completed 61CBCT, 997 OPG, and 2012 other operations (on average, 168 patients each month). Additionally, Head & Neck and Urology DMG Joint Clinic services were initiated to improve staff collaboration and patient care. Additionally, a less time-consuming MRI protocol with improved patient compliance was employed.

Research

The Department's academic members serve as principal investigators on clinical research projects and support clinical colleagues' research by offering imaging services. Currently work to develop AI characterized lung nodules, detect lung abnormalities, and differentiate between benign and malignant lung lesions in collaboration with a number of startups, particularly in the artificial intelligence industry is on-going.

Education

The Officer-in-Charge and department personnel used a variety of online, hybrid, and in-person platforms to present their research findings at many national and international conferences in 2022. MD Radiology residents, observers, and fellows received weekly instruction through case-based learning, didactic lectures, spotters, and journal club gatherings. Patients and their safety-related lectures began three times each week to educate the paramedical team on the use of equipment for safe procedures. Residents were given access to local and guest faculty lectures through internet platforms at their discretion.

Radiation Oncology Department

Officer-in-Charge:	Dr. Vedang Murthy
Radiation Oncologists:	Dr. Tejpal Gupta, Dr. Supriya Sastri, Dr. Jayant Goda Sastri, Dr. Tabassum Wadasadawala, Dr. Sangeeta Kakoti, Dr. Priyamvada Maitre, Dr. Shwetabh Sinha, Dr. Jifmi Jose, Dr. Revathy Krishnamurthy, Dr. Archya Dasgupta, Dr. Anuj Kumar
Medical Physicists:	Dr. SV Jamema, Ms. Reena Phurailatpam, Mr. Kishore Joshi, Ms. Jeevanshu Jain

Overview

The Department of Radiation Oncology is a modern and comprehensive department. Its goal is to offer comprehensive and efficient patient care through the expertise of its dedicated team. The team comprises of radiation oncologists, medical physicists, radiotherapy technologists, nurses, and other support staff, all of whom work together to provide a holistic approach to patient care.

Service

This Department provided external beam radiation therapy to 1084 patients and delivered 574 brachytherapy fractions to a total of 149 patients in the year 2022. The numbers were maintained as in 2021 even though the daily radiotherapy machine working hours were reduced by 2 hours (8 am to 7 pm). The use of modern and advanced brachytherapy applicators, such as the Venezia and Vienna Applicator, has become an essential component in the treatment of advanced gynecological tumors. These applicators facilitate the delivery of image-based brachytherapy, which has significantly improved the efficacy of treatment. The brachytherapy fraction numbers represent an overwhelming increase by approximately 110 % as compared to 2021.

The installation and quality assurance operations at the Hadron facility have demonstrated continued progress. The acceptance testing of gantry room no.2 was conducted between the dates of 12.1.2022 to 20.1.2022, whereas that of room no.1 was performed from 9.5.2022 to 20.5.2022. A radiation survey was carried out for gantry room no.1 between the dates of 7.2.2022 to 11.2.2022. The successful installation of the MR simulator has resulted in the operationalization of the MR scanner, rendering it available for use in both diagnostics and radiotherapy planning.

Research

The Department's faculty has demonstrated a high level of engagement in institutional and multi-institutional research protocols at national and international levels. In addition, physicians within the Department have consistently published their original research in peer-reviewed journals, including the Lancet Oncology, Journal of Clinical Oncology, JCO Global Oncology, International Journal of Radiation Oncology, Biology and Physics, Radiotherapy and Oncology, and Clinical Oncology.

Education

The Department serves as a training centre for postgraduate education and professional development for all levels of radiation oncology personnel across the country and the wider region. To date, the Department has conferred over 210 MD Radiation Oncology degrees and 245 Radiotherapy Technologist degrees to qualified candidates. Annually, this Department hosts the "Radiation Oncology Practicum," with the most recent being the XX Annual WCI-TMH Radiotherapy Practicum Workshop held on “Multimodality Imaging in Radiation Oncology" on 2nd and 3rd of September 2022.

Surgical Oncology Department

Officer-in-Charge: Dr. Sudhir Nair

Surgical Oncologists: Dr. Vani Parmar, Dr. Sajid Qureshi, Dr. Aliasgar Moiyadi
Dr. Vinay Shankhdhar, Dr. Deepa Nair, Dr. Prakash Shetty,
Dr. Vineet Kumar, Dr. Manish Pruthi, Dr. Rohini V Kulkarni,
Dr. Rathan Shetty, Dr. Muffaddal Khuzema Kazi, Dr. Amendeep Arora
Dr. Arjun Singh

Neurophysiologist: Dr. Parthiban Velayutham

Overview

The Department of Surgical Oncology provides continued care to a wide range of cancer patients. This includes in-patient care as well as outpatient clinics. The Department has expanded clinical service by running nine regular operating theatres five days a week and two operating theatres on Saturdays. The Department also conducts regular OPDs (newly registered as well as pre- and postoperative care follow-up OPDs) for breast, head and neck, neurosurgery and Urology. The inauguration of the new Solid Tumour Block (Raja S Rao Shodhika) has increased the bed strength for Surgical Services.

Service

In addition to providing emergency services, the breast and head and neck surgical services have regular outpatient clinics five days a week that offer all major surgical procedures. Additionally, ACTREC now hosts weekly outpatient clinics for the speech and swallow therapy service. The intra-operative neurophysiologic monitoring and image-guided procedures provided by the neurosurgical services help to carry out safer operations on patients who have tumours in sensitive areas. State of the art clinical services like HIPEC, minimally invasive laparoscopic surgery, and other complex surgeries like exenteration are offered by the GI services. A dedicated surgical oncologist was added to the division of urology-oncology at ACTREC, and their joint clinics are now held every Wednesday.

The Head and Neck (8298) and the Breast (8640) services together had more than 16,000 OPD consultations, which included 1179 new registrations for head and neck and 871 new

registrations for breast service. During 2022, over 2890 major procedures and 582 minor procedures were performed. These major surgeries were done by the Head and Neck (743), Breast (703), GI (792), Urology-Oncology (197), Neuro (148), Bone and Soft Tissue (84), and Gynae-Oncology (223) units.

Research

The faculty members are involved in several DMG coordinated research projects. The division of neurosurgery in collaboration with the Department of Remote sensing and Robotics, BARC, Mumbai have developed a fully functional Neuro-Robotic Lab/OT setup at ACTREC. The division of Head and Neck is coordinating the multicentre AREST (Adjuvant Radiotherapy in Early Stage Oral Cancer) study funded by the National Cancer Grid involving seven cancer centres across India. The 3D Modelling Laboratory developed under the guidance of breast service has extended its service in designing and printing custom 3D models for surgical planning.

Education

As part of the postgraduate training program, each year more than twenty surgical oncology postgraduate trainees rotate through ACTREC and are exposed to various clinical and academic activities at ACTREC. The Head and Neck Unit at ACTREC conducts regular teaching program consisting of lectures by faculty, presentations by resident doctors, case discussions and Journal Club on every working Wednesday. The Division of Plastic surgery is developing the anatomy skills laboratory and plans to conduct regular workshops for microvascular training of young doctors.

Department of Transfusion Medicine

Officer-In-charge : Dr Shashank Ojha

Associate professor : Dr Sumathi Hiregoudar

Assistant professor : Dr Suryatapa Saha

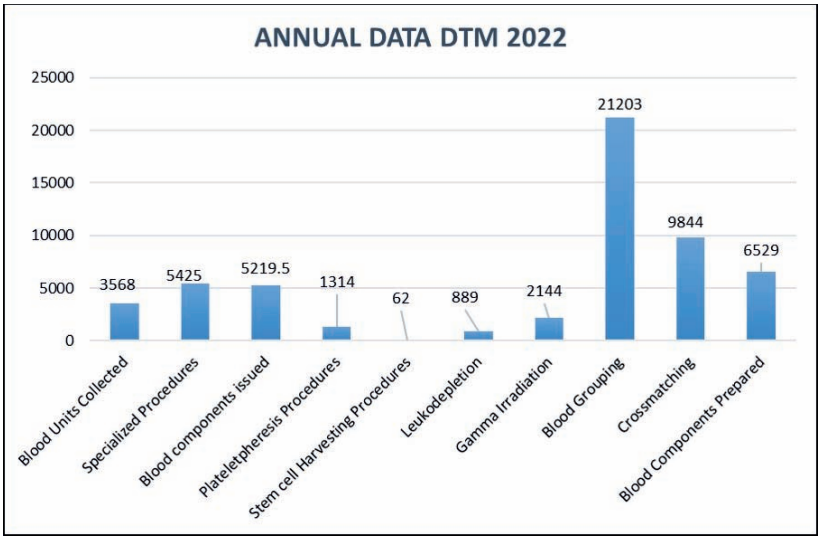
Overview

Department of Transfusion Medicine (DTM) is a fully-equipped licensed blood centre complying with the highest standards and is an essential component of tertiary care oncology centre that provides safe and adequate supply of blood components round the clock to meet the specialized hemotherapy need of patients admitted at ACTREC especially Bone Marrow Transplant (BMT), haemato-lymphoid (adult and pediatric), radiation and surgical-oncology units. It also caters to the blood component requirements of patients admitted in other hospitals in Navi Mumbai.

Service

The services offered by this Department include blood donation and apheresis including platelet apheresis, granulocyte apheresis, therapeutic leukapheresis, red cell serology, blood component separation, Transfusion Transmitted Infections (TTI) testing, storage and issue of blood products. Specialized services include peripheral blood stem cell (PBSC) harvest, cryopreservation, storage and inventory management of hematopoietic stem cells (HSCs), leukodepletion and gamma irradiation of blood components are integral part of the services. Advanced graft manipulation procedures like αβ-T cell depletion and CD45RA+ depletion procedures using Clinimacs plus immuno-magnetic cell sorter are performed in complicated Bone Marrow Transplant patients. Department has played an indigenous role along with collaboration of IIT Bombay in the development of novel CAR-T cell therapy for the treatment of cancers and immune disorders. Department has taken steps in supplying of surplus plasma to plasma fractionation company. During the period from January to December 2022, the department collected a total of 3568 blood units, prepared 6529 blood components, and issued 5219.5 blood components. In addition, 1314 platelet apheresis and 62 stem cell harvesting and 11 granulocytopheresis procedures were performed. Under specialized blood components, 889 units were leuco-depleted and 2144 were gamma-irradiated. Blood

grouping and cross-matching was done on 21203 and 9844 blood samples respectively. The department organized 54 outdoor blood donation camps. DTM routinely participates in EQAS program conducted by Indian Red Cross Society EQAS.



Research

Faculty members are currently involved in multiple collaborative projects with other departments at TMC of exploring the role of indigenously developed Chimeric Antigen Receptor (CAR) T cells and Natural Killer (NK) cells in the treatment of leukemia.

In addition, three projects were undertaken by the Principal Investigators of the department namely “Analysis of Donor Safety and Product Quality in Pediatric Peripheral Blood Stem Cell Harvest”, “Effect of repeat plateletpheresis on iron stores among repeat voluntary male platelet donors- A single tertiary care hemato-oncology centre experience” and “Evaluation of Intra operative transfusion indicators in surgical oncology patients in a tertiary care Oncology Centre”.

Education

The doctors and staff members imparted training in PBSC harvest and other transplant-related activities to three MD students from other centres as a part of their curriculum, and to two doctors from other hospitals. Faculty and staff members presented scientific papers and attended 8 national/ international conferences/ scientific meetings including virtual conferences/ meetings and also underwent training to keep abreast with the latest developments in the field.

Translational Research Laboratory

Principal Investigator: Prof. Indraneel Mittra
(Dr Ernest Borges Chair in Translational Research)
(Professor Emeritus, Department of Surgical Oncology)

Scientific Officers: Dr. Ranjan Basak
Dr. Kavita Pal
Dr. Raguram GV
Mr. Naveen Kumar Khare

Overview

The primary focus of this laboratory is on the role of cell-free chromatin particles in ageing, degenerative disorders and cancer.

Research

The Translational Research Laboratory continues to work on the novel finding that cell-free chromatin (cfCh) that circulates in blood or those that are released locally from dying cells can freely enter into healthy cells to damage their DNA and induce inflammatory cytokines. In 2020 the following novel observations were made: Genomic integration of circulating cell-free chromatin particles activates all known hallmarks of cancer and Immune checkpoint PDL-1; Metastases arise as new cancers from cells of target organs transformed by cell-free chromatin particles released from dying circulating tumour cells, this finding challenges the dogma that metastasis arises from cells derived from the primary tumour; Cell-free chromatin particles released into the microenvironment from dying tumour cells activate cancer hallmarks in surviving cells, this study was performed on advanced squamous cell carcinoma of oral cavity and has therapeutic implications; cell-free chromatin particles activate all known immune checkpoints; cell-free chromatin particles from dying cells are global instigators of ageing and neurodegeration.

Education

Two trainees gained research experience in this laboratory in fulfillment of MSc dissertation projects.

CANCER RESEARCH INSTITUTE

Dr. Sudeep Gupta (Director, ACTREC)
Dr. Prasanna Venkatraman (Deputy Director)

Basic Research Team

- **Dr. Sharathchandra Arandkar**
- **Dr. Kakoli Bose**
- Dr. Pradip Chaudhari
- **Dr. Murali Krishna Chilakapati**
- **Dr. Sorab Dalal**
- **Dr. Abhijit De**
- Mr.Shashadhar Dolas
- **Dr. Amit Dutt**
- **Dr. Shilpee Dutt**
- Mr.Nikhil Gadewal
- Dr. Poonam Gera
- **Dr. Rukmini Govekar**
- **Dr. Sanjay Gupta**
- **Dr. Syed Hasan**
- Dr. Arvind Ingle
- **Dr. Rohan Khadilkar**
- **Dr. Jyoti Kode**
- Dr. Pradnya Kowtal
- **Dr. Manoj Mahimkar**
- **Dr. Sejal Patwardhan**
- **Dr. Pritha Ray**
- **Dr. Rajiv Sarin**
- **Dr. Tanuja Teni**
- Dr. Rahul Thorat
- **Dr. Ashok Varma**
- **Dr. Nandini Verma**
- **Dr. Prasanna Venkatraman**
- **Dr. Sanjeev Waghmare**
- Dr. Ujjwala Warawdekar

Principal Investigators (PIs) are shown in bold

Biomolecular Structure, Function and Alteration Group

Bose Laboratory

Principal Investigator: Dr. Kakoli Bose

Overview

The research focus of this group is the study of macromolecules involved in the apoptotic pathway, and their implications in normal cellular functions and pathogenesis. The group works on the high-temperature requirement family of serine proteases (HtrA); the interaction between proteins of extrinsic cell death pathway forming DISC assembly, and the Bcl2 family proteins and their interacting partners. Moreover, the group is now entering into application-based translation research that includes enzymes involved in metabolic reprogramming and their role in altering cancer signaling pathways.

Research

The highlights of the research findings in the year 2022 include the solution of a crystal structure of HtrA2 variant (PDB id: 7VGE). The group has quantitatively and structurally elucidated the mechanism of action of HtrA2 with a cover page publication in Structure, Cell Press and has also published a protein purification method paper as well as an invited review on the enigmatic role of HtrA2. The research findings from this group have been highlighted in Scisoup India through news and podcast.

Education

The Principal Investigator is recognized as a guide for the Ph.D. (Life Sciences) degree of the Homi Bhabha National Institute as a full Professor. Currently, five graduate students - Ms. Rashmi Puja (submitted synopsis), Ms. Rucha Kulkarni, Ms. Trishita Banerjee, Ms. Sudakhina Bhattacharyya, and Ms. Oindrila Ghosal, are working towards their doctoral dissertation. Ms. Assna Parui defended her thesis successfully in the report year.

Biomolecular Structure, Function and Alteration Group

Prasanna Laboratory

Principal Investigator: Dr. Prasanna Venkatraman

Overview

Protein-protein interactions (PPI), typify physical, signalling and regulatory networks that orchestrate cellular responses. PPI are sensitive to levels, mutations, post translational modifications (PTM), and subcellular boundaries. Cancer cells exploit these to rewire networks to maintain mosaic correlations that allow them to survive. The lab tries to understand PPIs at different hierarchical levels with a long-term goal is to expose the Achilles heel in cancer. The interested biomolecules are chaperones: PSMD9, PSMD10 which help in proteasome assembly and 14-3-3 which interacts with phosphoproteins. In this direction, we have embarked on structure guided inhibitor design and phenotypic screening.

Research

New findings include a) identifying crystallization conditions for high-throughput drug discovery for PSMD10; b) screening and identification of Doxorubicin as an inhibitor of PSMD10; c) establishing that PSMD10 acts along the NF-kB signaling pathway; this is an important contribution in the field which previously considered PSMD10 as an inhibitor of NF-kB, a key survival factor in cancer cells; d) establishing a novel ligand specific role of ATP in 14-3-3 proteins and describing its allosteric role in ligand dissociation/binding; e) structure guided inhibitor of CLIC1 an ion channel protein that interacts with PSMD10 was identified.

Education

Principal Investigator is an active member of the current academic committee and a member of the doctoral committee of more than 20 Students and a chair of many DC committees.

Administration

As the deputy Director CRI PI has made enormous effort to bring funding for cancer research. Three main projects have been sanctioned by DAE that would allow overall growth of research and help the momentum towards translational research. New project cell and purchase office has been established in CRI for the benefit of the faculty.

Student Participation

One student has submitted the thesis. One has submitted the synopsis.

Biomolecular Structure, Function and Alteration Group

Varma Laboratory

Principal Investigator: Dr. Ashok Varma

Overview

Multidisciplinary in-silico, in-vitro, biophysical, structure biology and bioinformatics-based approach are used to evaluate the pathogenicity of mutations identified from large cohorts of patient population. Furthermore, studies on protein-protein interactions to explore the function associated to binding interface of BRCA1-binding partners. The overall goal of this laboratory is to determine the crystal structure of different functional domains of BRCA1/2, MAPK, Eph-Ephrin, and PML-RARA (wild-type, mutant) and associated binding partners. The proteomics project goal is to validate the panel of protein molecules for early detection biomarkers. Indian Cancer Database for Translational Research –ACTREC (ICDTRA) with the support of DBT shows good progress. Macromolecular crystallography and X-ray diffraction facility, Bioinformatics and computation system biology of cancer-BIC centres are actively used by research scholars and faculty of basic and translational research. Under the program "Azadi Ka Amrit Mahotsav", this laboratory organized one webinar with country-wide participation.

Service

Macromolecular crystallography and X-ray diffraction facility provides hands on training in collection of diffraction data for protein crystals. The Bioinformatics Centre (BIC) supported by Department of Biotechnology (DBT) supports scientists in their research work. Dedicated staff of the Centre, recruited from DBT funds, provides full support to train research scholars and faculty.

Research

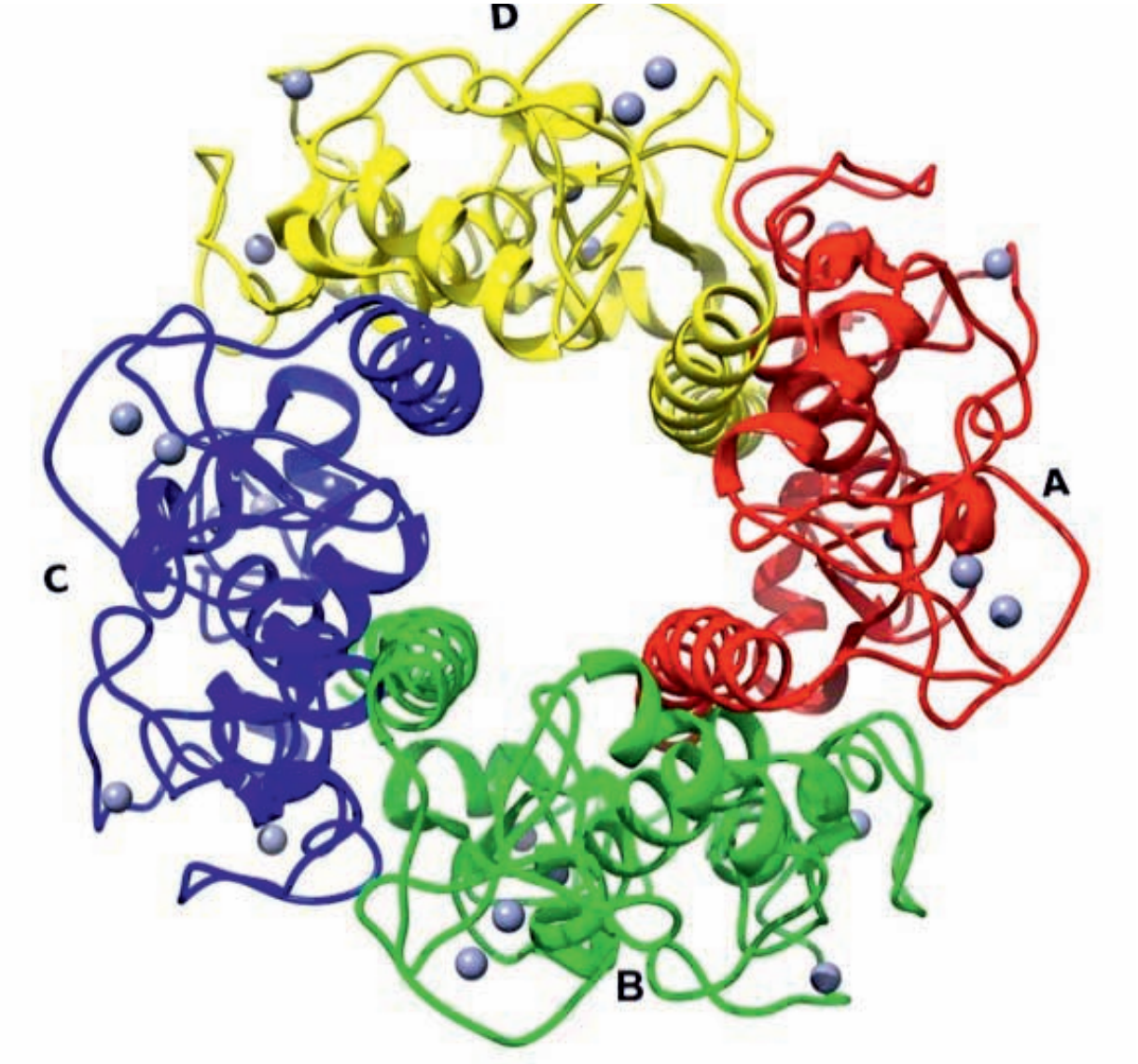
Multi-disciplinary and multi-institutional projects are ongoing which address important problems in cancer biology. These are; studies on the structural and functional basis of pathogenicity of mutations identified in different domains of BRCA1 and BRCA2 protein, structure determination of proteins like MAPK,EPH-Ephrin complexes and characterization of

the folding pattern between PML-RARA wild-type and mutant. This laboratory has identified a panel of proteins expressed differentially at different time frame of radiotherapy treatment. These proteins are divided into categories among the patients who responded well and poorly. A panel of 10 protein molecules including clusterin (CLU) and gelsolin (GSN) were consistently and differentially regulated. These identified proteins may serve as biomarkers to provide early indications of HNSCC treated with radiotherapy. Furthermore, a protocol has been explored to perform serum proteomics. A serious attempt has been made to prepare Indian Cancer Database for Translational Research –ACTREC (ICDTRA)

Education

The Principal Investigator is a recognized guide for PhD in Life Sciences of the Homi Bhabha National Institute. Presently 7 Students Ms Suchita Dubey, Mr. Siddharth Barua, Ms. Neha Mishra, Mr. Subhashish Chakraborty, Ms. Vaishnvee Chikhale, Mr. Aman Jaiswal and Gokul Arora are working towards a thesis in Life Sciences under the aegis of the HBNI. The projects are: structural and functional aspects of PML-RARA (Ms. Suchita); BRCT domains (Mr. Siddhartha); structural evaluations of different parts of BRCA1 (Ms. Neha); Ephs-Ephrin complexes (Mr. Subhashish); MAPK Pathways (Ms. Vaishnvee), Mr. Aman and Mr. Gokul are freshers and will work on structure and proteomics related projects. Besides, in the laboratory, a DBT-project scientist is actively engaged in bioinformatics related work, training is provided to students from different institutions for degree dissertation. The PI organized a Web-conference entitled, “Recent Trends of Computational Biology in Basic and Translational Research” in March 2022 with an attendance of 400 participants.

Figure: 3D model structure of the PML-RBCC tetrameric form with Zn+2. Green, cyan yellow and grey colour represents tetrameric assembly



Biomolecular Structure, Function and Alteration Group

Rukmini Laboratory

Principal Investigator: Dr. Rukmini Govekar

Overview

The group is using multi-'omics' approach to delineate the mechanism of resistance to tyrosine kinase inhibitors (TKI) in chronic myeloid leukemia (CML). In the initial chronic phase (CP) of CML about 90% patients respond to the TKI- imatinib (IM). Failure of salvage strategies such as increased dose of imatinib or next generations of TKIs leave non-responder CPs and 80% of patients in terminal stage of blast crisis (BC) without an effective treatment option. Delineation of mechanism of resistance to TKIs is expected to: 1) Identify potential therapeutic targets for the non-responders; 2) Identify early markers to predict which of the initially responding CP patients would turn resistant during therapy.

Research

Previous genomic and proteomic analysis of imatinib sensitive and resistant cells undertaken in the laboratory identified important features of the mechanism of imatinib resistance in CML-BC, despite inhibition of activity of Bcr-Abl by imatinib. In proteomic analysis, levels of p38MAPK and 14-3-3ε, both components of Bcr-Abl pathway were found to be up- and down-regulated respectively in resistant cells. Their levels indicated active Bcr-Abl pathway, through imatinib inhibited Bcr-Abl activity. It was demonstrated that in resistant cells, reduced levels of β1 integrin, a differentiator which did not belong to Bcr-Abl pathway, caused observed alterations in levels of p38MAPK and 14-3-3ε. Further kinome and phosphoproteome analysis identified other components such as PKCβ of this pathway, thereby providing vital clue for the mechanism of illegitimate activation of Bcr/Abl pathway in imatinib resistance. Further, previous genomic analysis showed that aberrations accumulate in chromosome 8 with progression of resistance, which results in amplification of gene encoding transcription factor PLAG1. PLAG 1 overexpression results in reduction in levels of β1 integrin. Analysis of transcriptome of resistant cells also identified β1 integrin as a hub molecule. MicroRNAs which can regulate expression of β1 integrin pathway components were also found to be differentially regulated in resistant cells. Further, mitochondrial redox homeostasis is

dysregulated in resistant cells and initial studies indicate the role of β1 integrin mediated modulation of PSMD9 in this dysregulation.

Education

The Principal Investigator is a recognized PhD Life Sciences mentor of the Homi Bhabha National Institute. Presently four graduate students – Mr. Rahul Mojidra, Mr. Manish Bhat, Ms. Neha Agarwal and Ms. Shashikumari are working towards their doctoral degree. Two trainees worked in this Laboratory in the report year.

Cell and Tumor Biology Group

Teni Laboratory

Principal Investigator: Dr. Tanuja Teni

Overview

The research programs of this group aim to gain insights into the molecular basis of oral and cervical tumorigenesis. Inhibitor studies to target the deubiquitinases, which interact with and stabilize mutant p53 are ongoing. Evaluation of the role of Mcl-1 in radiation induced DNA damage response and autophagy in oral cancer cells is underway. Using knockdown strategies, the molecular mechanisms by which TCTP contributes to radioresistance is being explored in the in-house established radioresistant oral cancer cells. The role of HPV-16 in the generated chemoradioresistant cervical cancer cell line model is being assessed post E6/E7 knockdown.

Research

Studies in this laboratory investigated the half-life of mutant p53 post-WP1130 treatment using the cycloheximide chase assay. WP1130 treatment decreased the half-life of mutant p53 protein in SK-BR-3 and C33A cells, suggesting that WP1130 affects the stability of mutant p53. As WP1130 is a non-selective deubiquitinase inhibitor of UCH37, USP5, USP14 and USP9X, the interaction of these DUBs with mutant p53 was checked using Immunoprecipitation studies. Results showed the interaction of USP9X, USP5 and UCH37 with mutant p53 in SK-BR-3 and C33A cells, implying their possible role in stabilizing mutant p53. To understand the role of Mcl-1 in DNA Damage Response, Mcl-1 was knocked down using siRNA and its effect on γH2A.X foci formation post Ionising Radiation (IR) treatment, was checked. A significant decrease in γH2A.X foci post IR from 30 minutes to 2 hours was observed, indicating a defect in the sensing of Double Strand Breaks. Also observed was decreased phosphorylation of ATM (Ser1981) in Mcl-1 knockdown cells at 30 minutes and 2 hours post radiation and decreased phosphorylation of its downstream target BRCA1. To understand the role of Mcl-1 in radiation induced autophagy, Mcl-1 using siRNA was knocked down and a decrease in the LC3A/BII levels at 6 and 12 hours post IR was observed. A significant accumulation of LC3A/BII levels as well as

increased LC3A/B puncta in Mcl-1 knockdown cells at 6 and 12 hours post IR in Chloroquine treated cells, indicating knockdown of Mcl-1 led to increased autophagy flux in oral cancer cells post IR was observed. Interestingly, TCTP overexpression in treatment-naive oral tumors from patients treated with curative radiotherapy was significantly ($p<0.01$) associated with unfavourable treatment response and poor RFS ($p<0.0001$), implying TCTP to be a radioresistance-related factor. The characterization of the in-house established chemo-radioresistant HPV 16 positive SiHa cells is ongoing. Interestingly elevated levels of E6 and E7 proteins were observed in chemo-radioresistant versus parental SiHa cells and their knockdown studies are underway.

Education

The Principal Investigator is a recognized guide for PhD in Life Sciences of the Homi Bhabha National Institute. Presently four students –Mr. Abhay Uthale, Ms. Dipti Sharma, Mr. Swapnil Oak and Ms. Reshma Reddy are working on their doctoral theses. In the report year, five trainees worked in the Laboratory either for Master's dissertation or research experience. The Laboratory also has an in-house program of data presentations and Journal club each week. The Faculty and students of the Laboratory attended one National and one International conference in 2022.

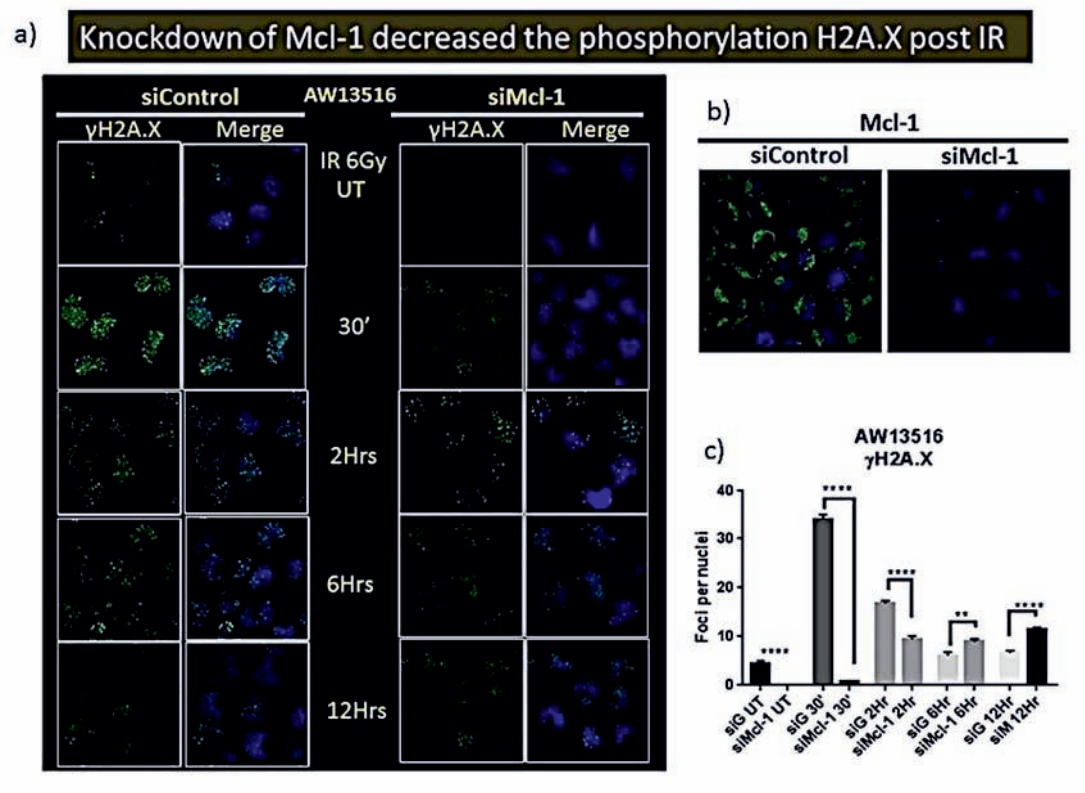


Figure 1:

(a) AW13516 cells seeded on coverslips were transfected with siControl (50nM) and Mcl-1 siRNA (50nM). After 48 hours of transfection, cells were treated with 6Gy of IR, and after indicated time points, cells were immunostained for γH2A.X (Green) with DAPI as a counterstain.

(b) Knockdown efficiency was checked by immunostaining for Mcl-1 (c) γH2A.X foci per nuclei were counted using ImageJ software and analysed by GraphPad Prism. Data is represented as SEM of three independent experiments with more than 120 cells. Data were analyzed with an unpaired student's *t* test with Welch's correction and a 95% confidence interval. p *value* is represented as ∗∗ ($p< 0.0021$), and ∗∗∗∗ (0.0001).

Cell and Tumor Biology Group

Sorab Laboratory

Principal Investigator: Dr. Sorab Dalal

Overview

This laboratory has demonstrated that the iron siderophore Lipocalin2 (LCN2), is required for therapy resistance and invasion in colorectal cancer cell lines by regulating the levels of intracellular iron and the levels of ROS. In collaboration with colleagues at MSMF and Beyond Antibody, it was demonstrated that a novel monoclonal antibody targeting LCN2 inhibits therapy resistance and tumour progression. In addition, a syngeneic mouse model that leads to disease progression in the colon with a concomitant increase in LCN2 levels has been established. Further, novel mechanisms by which the 14-3-3 family of proteins regulate centrosome duplication and centrosome clustering, which is often disrupted in human cancers have been identified.

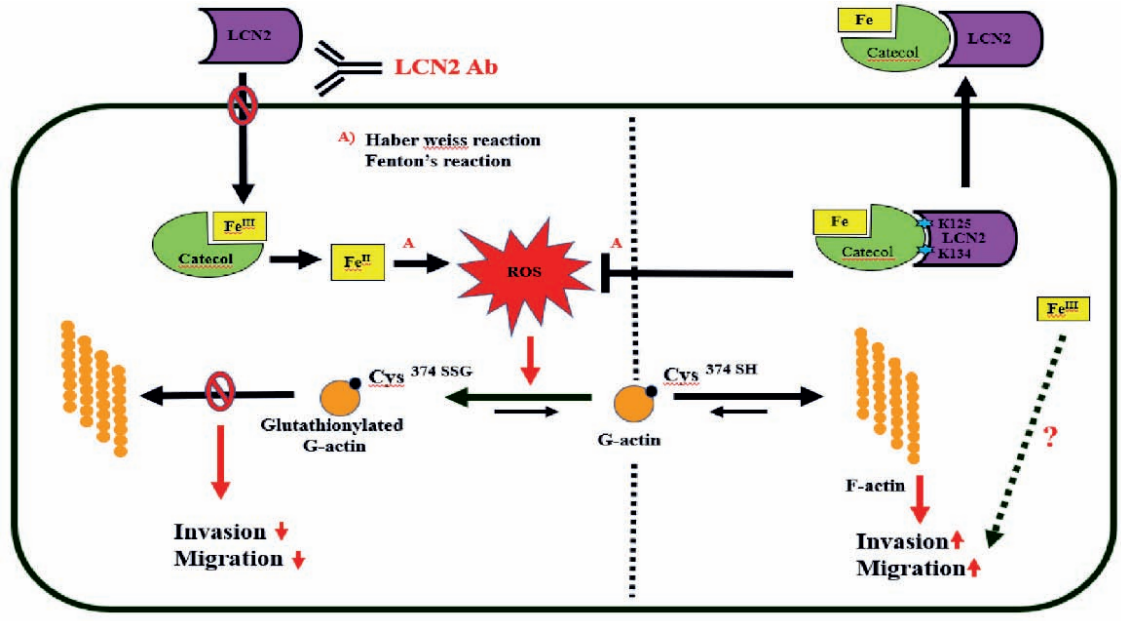
Research

Ferroptosis is an iron dependent form of cell death that is activated when tumor cells are treated with cytotoxic therapies. Therefore, multiple tumor types have developed ways in which to inhibit ferroptosis thereby promoting therapy resistance. The iron binding siderophore, LCN2, is over-expressed in multiple solid tumors and work from this laboratory demonstrated that it promoted therapy resistance in colorectal cancer by reducing intracellular iron and stimulating the expression of genes required for detoxifying peroxidated lipids. These events also lead to increased invasion and tumor progression. A novel monoclonal antibody developed by collaborators, sensitized tumors to therapy and inhibited tumor progression. Additionally, a novel role for acidic residues in the 14-3-3 peptide binding groove in ligand binding has been identified and mutation of these residues either promotes or inhibits complex formation with ligands was demonstrated. Work from this laboratory has also demonstrated that a knockout of two 14-3-3 isoforms, 14-3-3ε and 14-3-3γ, leads to centrosome amplification. However, cells with a 14-3-3ε knockout undergo multipolar mitoses and cells with a 14-3-3γ knockout preferentially undergo clustered pseudo-bipolar mitoses. This is due to the fact that desmosome function is compromised in cells lacking 14-3-3γ. As

14-3-3 proteins regulate multiple cellular pathways, analysis of the phenotypes underlying loss of a specific 14-3-3 isoform must consider how different pathways contribute to the observed phenotype.

Education

The Principal Investigator is a recognized guide for Ph.D. in Life Sciences under the Homi Bhabha National Institute and five PhD students; Amol Lonare, Bhagya Shree Choudhary, Monika Jaiswal, Prerana Uttankar and Bushra Khan worked on their doctoral thesis in this laboratory during 2022. Dr. Dalal was instrumental in setting up the MD/PhD program at the Tata Memorial Centre that has now been approved by HBNI. Ten trainees worked in this laboratory in the report year, for a Bachelor's or Master's dissertation. Laboratory members participated in weekly in-house seminars and journal club and presented their findings at five meetings in 2022.



Actin polymerization is required for invasion and migration. LCN2 promotes actin polymerization by decreasing the intracellular levels of reactive oxygen species (ROS) and ferrous iron. Depletion of iron and ROS prevents actin glutathionylation leading to increased actin polymerization, invasion and migration. Inhibiting LCN2 expression or function leads to increased actin glutathionylation and a decrease in actin polymerization, invasion and migration.

Cell and Tumor Biology Group

Scientific Officer 'G': Dr. Ujjwala Warawdekar

Overview

Tumor cell derived signalling can lead to change in stromal remodelling, invasive properties and may contribute to cellular dis-regulation and transformation. Cellular Fibronectin (cFN) in plasma of patients with breast cancer indicates the presence of a malignancy which could be a concerted effort of the degradation of ECM and the synthesis of cFN by the cancer cells, released into circulation, raising questions like; does the presence of cFN in plasma of patients with cancer impact tumour progression by inducing angiogenesis, invasion and metastasis, or sustaining proliferation? And would the presence of cFN affect response to chemotherapy? Another on-going problem is on Connexins, constituent proteins of the Gap Junction Intercellular Channel - which mediates exchange of small molecules with the extracellular environment, with classical roles of communication, enhanced or manipulated experimentally. Connexins also have a non-classical role carried out by the C terminal domain of the protein molecule by virtue of its phosphorylation status. The localization of Connexins in subcellular compartments may be contributing to the non-classical role especially in diseases like cancer.

Research

NSCLC comprises about 80-85% of Lung cancer and is mainly of Adenocarcinoma or Squamous Cell pathology. The hypothesis that in NSCLC with adenocarcinoma pathology both Connexin 43 and Connexin 32 have a non-classical function was based on the observations in the NSCLC cell lines, A549 and HOP62 which expressed both Connexin 43 and Connexin 32 determined by RT-PCR and Western blotting. However, the localization was not only the plasma membrane. Subcellular fractionation analysis of Connexin proteins showed that Connexin 43 is present in the mitochondria and nucleus. It would be interesting to identify interacting proteins in these subcellular compartments and the role of Connexin 43 in Adenocarcinoma of NSCLC and the possibility of identifying drug targets. It is proposed to study NSCLC of the squamous pathology which has been initiated. Evaluating the role of Connexin 43 and 32 by silencing expression

will be another approach. Assessment of cellular Fibronectin in different cancers and subtypes has been done using cell lines. Characterization of the presence of cellular Fibronectin (cFN) in plasma samples by Western Blotting using 2 different antibodies; DH1 specific for the EDA domain of cFN and FBN11 specific for cFN, loading control transferrin, validating with commercially available pure cFN and their quantification by Image Lab software is also being done (Figure 1).

Education

In the year 2022, the faculty contributed to the Centre's academic and training program. Four students for Master's dissertation, one for B Tech summer training, one for doctoral collaborative work and two for experience training were accepted in this laboratory in the report year. The faculty also participated in area-specific virtual conferences and webinars.

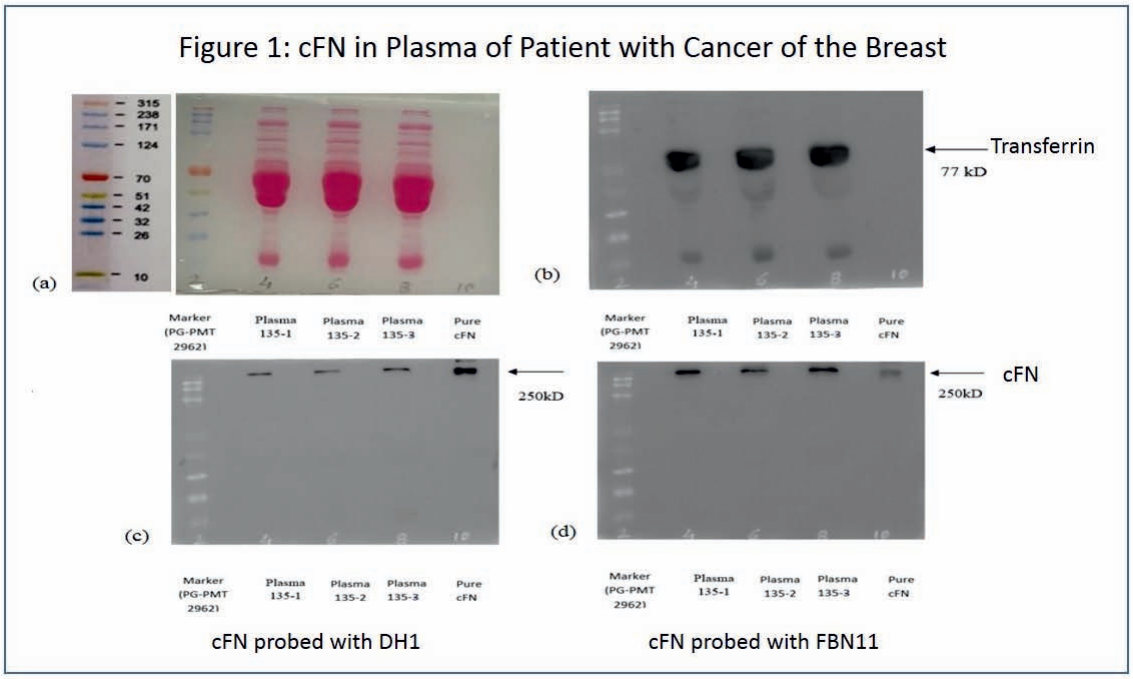


Fig 1: Characterization of Cellular Fibronectin (cFN) with Western Blotting in plasma of patients with cancer of the Breast.

(a) Ponceau S staining of plasma samples on a PVDF membrane.
(b) Loading Control, plasma protein Transferrin (MW 77 Kd) seen in the plasma samples.
(c) EDA domain specific antibody for presence of CFN. Positive Control, pure cFN (250Kd)
(d) Developed with FBN-11 antibody for cFN. Positive Control, pure cFN (250Kd

Cell and Tumour Biology Group

Principal Investigator: Dr. Syed Hasan

Overview

This laboratory examines the interplay between anti-apoptotic proteins and cyclin dependent kinases and how this interplay can serve as a potential therapeutic target in Acute Myeloid Leukemia (AML). With the advent of targeted therapy using arsenic trioxide (ATO) and All-Trans Retinoic Acid (ATRA) very high cure rates (>90%) can be achieved in low/intermediate risk group Acute Promyelocytic Leukemia (APL). However, high risk group patients (white blood cell counts >10000/μl) still require chemotherapy. The majority of post-remission deaths and relapses are linked to high risk group patients due to toxicity associated with chemotherapy or acquired ATO resistance.

Research

Research in this laboratory focuses on the mechanisms by which leukemic cells co-opt and influence intracellular signaling pathways to promote deregulated cell survival, proliferation and growth. The high risk APL patients have inferior survival compared to low and intermediate risk groups. In low and intermediate risk groups, arsenic trioxide works synergistically with ATRA to cure the disease while high-risk group patients still require chemotherapy. There is no systematic study to genetically and molecularly characterize high-risk APL and associated features (such as FLT3-ITD), therefore, using proteomics and genomics based approaches, this Laboratory is working to molecularly and genetically characterize high risk APLs. The success story of acute Promyelocytic leukemia treatment is a paradigm for translational oncology. Despite that, it is very despairing to see a sizeable number of patients presenting with severe bleeding complications and some of them losing the battle within few weeks of diagnosis. The research outcome of this project hopefully, will open new avenues for a subgroup of APL patients who present with severe bleeding events for better treatment of coagulopathy, reducing early deaths. If consumptive coagulopathy is controlled, then by reducing early deaths, the probability of APL cure in the real-world scenario will exceed 90-95% in low and intermediate-risk patients and 75-80% even in high-risk patients, highlighting the importance of understanding the pathophysiology APL associated coagulopathy and initiating prompt and appropriate management strategies. From January-December 2022, this Laboratory has contributed in two research publications (PMIDs: 36346307, 34658646).

Education

The Principal investigator is a recognized guide for Ph.D. in Life Sciences under the Homi Bhabha National Institute. Presently Ms Tarang Gaur, Ms Deepshikha Dutta, Mr Akash Maiti and Mr Anup Jha are working towards their doctoral thesis. Ms Deepshikha Dutta bagged the Dr. J.C. Patel Best oral presentation Award in the 63rd Annual Conference of Indian Society of Hematology & Blood Transfusion held on November 3-6, 2022 at Biswa Bangla Convention Centre Kolkata. Ms Tarang Gaur also received a Travel grant award to attend the EMBO Workshop held on 16th to 20th September 2022 at Cavtat, Croatia. Mr Anup Jha new PhD student of my lab won first prize in National Blog Writing Competition in 8th India International Science Festival 2022 held at MANIT, Bhopal MP, from 21-24 Jan 2023 organized by Government of India.

Carcinogenesis, Genome Biology, and Precision Medicine Group

Sarin Laboratory

Principal Investigator: Dr. Rajiv Sarin

Overview

The group aims to understand the molecular basis of inherited and sporadic cancers, and develop translational algorithms through molecular biology and functional genomics. The group addresses these questions through: A) Large cohort of over 14000 families with various inherited cancer syndromes using banked DNA and lymphoblastoid cell lines; B) BRCA-GEL case control study with 2800 breast cancer cases / matched healthy controls; C) TMC International Sarcoma Kindred Study (TISKS) a case control study with 560 osteosarcoma cases / matched controls enrolled from TMC; D) International Cancer Genome Consortium (ICGC) project covering 500 Gingivo-Buccal SCC patients with full clinico-pathological annotation, follow up and somatic / germline NGS analysis and functional studies.

Service

The genetics and genomics research methodologies, variant database and clinical phenotype correlation established by the group has helped start a comprehensive NGS Cancer Genetics Laboratory in ACTREC in May 2021. It is the only laboratory in any Government institution providing Comprehensive Germline NGS Genetic Testing services and serves as the national referral laboratory. During 2022 germline NGS was done in house for 1644 cases and the cancer genetics clinic enrolled 1962 new families.

Research

The group has established the genetic basis of rare inherited cancer syndromes, penetrance estimates and genotype – phenotype correlation for different gene mutations. The group has characterized several rare and novel germline variants as likely benign or pathogenic based on co-segregation, co-occurrence and functional studies. The group had previously identified 22

frequently occurring germline mutations in BRCA1, BRCA2, MLH1 and MSH2 genes associated with various Indian geo-ethnic groups. In the report year, 4 additional recurrent and several novel germline mutations were identified. Under the ICGC project the genomics leads were followed with functional characterization and the novel mechanism of action of aspirin in chemoprevention and its effect mediated through AAM pathway genes and mechanism of ARID2 gene was established. Three rare brain tumour cell lines were established with phenotypic characterisation.

Education

The Principal Investigator is a recognised guide for Ph.D. in Life Sciences under the Homi Bhabha National Institute. The group provided training to 12 students in the laboratory genetics and cancer genetics counselling. The laboratory conducts an active weekly academic program in which the updates in lab-work, seminal research papers and interesting research papers are presented.

Carcinogenesis, Genome Biology, and Precision Medicine Group

Gupta Laboratory

Principal Investigator: Dr. Sanjay Gupta

Overview

Histone proteins with site-specific post-translational modifications and polyadenylation of replication-dependent histone isoforms are emerging as key players in cancer and resistance mechanisms. Ongoing studies have shown the polyadenylation of histone isoform mRNA under stress conditions due to the downregulation of SLBP and altered HuR/BRF1 levels, causing histone stress in the cell. Moreover, drug and hypoxia-induced resistance have shown altered mitochondrial structure and slow proliferation. Due to downregulated glycolysis and oxidative phosphorylation in drug-tolerant persistor or drug and hypoxia-induced resistant cells, the altered metabolic state resulted in hypoacetylation of chromatin. In continuation of earlier leads, the genomic localization studies are on the way for H3.3 and H3.2 genes and H3S10phK14ac in gastrointestinal cancers to decipher the pathways regulated by cancer-specific marks for potential application in clinics. These studies suggest combining chromatin modifiers-specific inhibitors targeting hypoacetylation with chemotherapy may offer better clinical outcomes.

Research

Recently, the group has shown that replication-dependent histone isoform mRNA, under stress conditions like hypoxia and drug treatment, despite tight regulation, undergo polyadenylation rendering their presence throughout the cell cycle. The downregulation of SLBP and BRF1 and an accumulation of HuR increases histone isoforms polyadenylation in liver and breast tumor tissues. The histone isoform polyadenylation potentially disturbs the DNA: histone ratio leading to genomic instability and cancer. Moreover, ongoing drug and hypoxia-induced resistance studies have shown altered mitochondrial structure and slow proliferation in DoxR HeLa and breast cancer cells, respectively. The DoxR phenotype is attributed to the downregulated glycolysis and oxidative phosphorylation, with autophagy as a survival mechanism. However, in cisplatin-resistant cells targeting PI3K-AKT signaling and glycolysis leads to alteration in histone acetylation levels and re-sensitization of resistant cells to chemo-drug. This provides evidence of the importance of the pathways in histone acetylation

regulation and cisplatin-resistant cells' cell survival. The post-hypoxia-reoxygenation of radiation-resistant cells displays an enhanced aggressive phenotype by modulating their bio-energetics profile and inducing the expression of genes associated with cell survival, DNA repair, and antioxidant potential. These studies in cancer and resistant cells highlight that metabolism and epigenetics play a critical role in cancer and resistance mechanisms.

Education

The Principal Investigator is affiliated to the Homi Bhabha National Institute as a mentor for Ph.D. in Life Sciences. Mr. Sanket Shah and Mr. Mudasir Rashid were awarded the PhD degree in 2022. Presently, six students – Ms. Tripti Verma, Mr. Abhiram Natu, Ms. Sukanya Rauniyar, Ms. Anjali Singh, Ms. Parul Sachdeva, and Ms. Flevia Anthony are working towards their doctoral theses. The PI; is also a recognized guide of MAHE, Manipal - Ms. Riddhi Pandya is working as a Ph.D. student, is on doctoral committees of research scholars undergoing Ph.D. programs at ACTREC and other institutes like BARC, Amity, NMIMS, and NIRRH and is associated with the doctoral program for Ph.D. and MD-PhD students. During the year, trainees were accepted for Master's dissertation and experience. Laboratory members conducted in-house data presentations, abstract and journal club and participated in national/ international conferences.

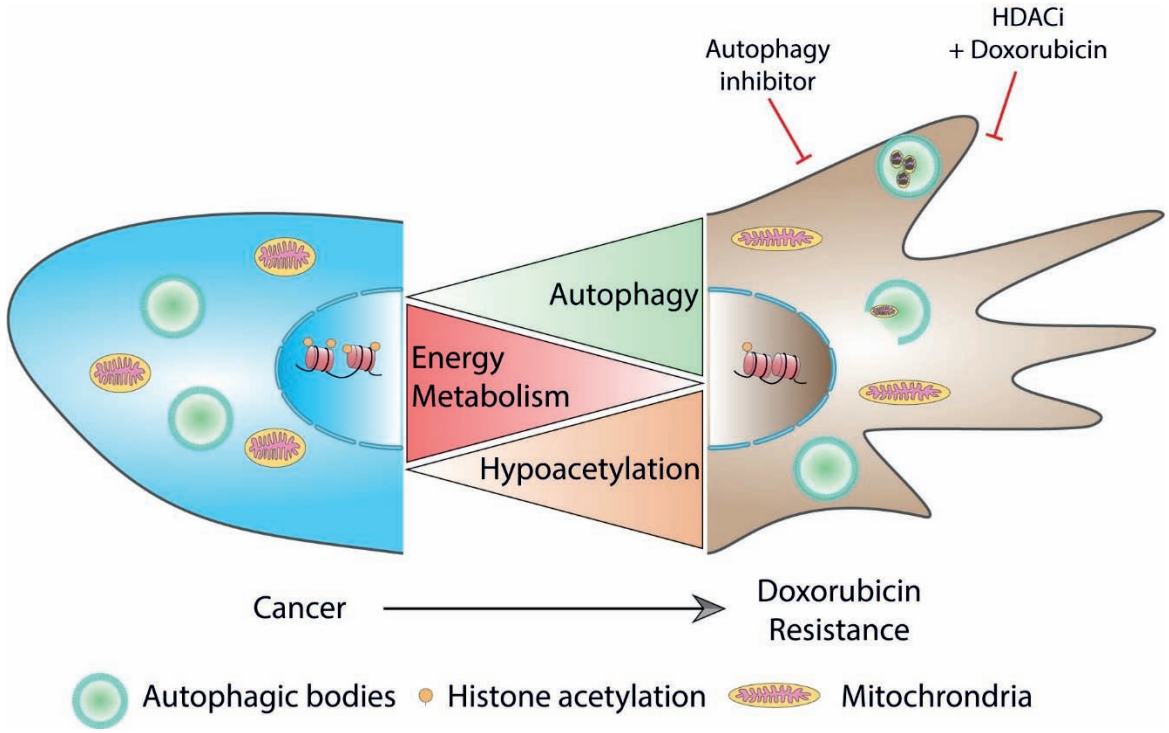


Figure: The molecular landscape of doxorubicin-resistant cancer cell lines: Drug-resistant cell show slow proliferation with altered mitochondrial structure, and activated autophagy helps survival by evading apoptosis. Moreover, drug-resistant cells have downregulated energy production pathways, glycolysis, and oxidative phosphorylation with hypo-acetylation of chromatin. Combinatorial therapies with HDAC inhibitor and chloroquine induce cell death of resistant cervical and liver cancer cells.

Carcinogenesis, Genome Biology, and Precision Medicine Group

Mahimkar Laboratory

Principal Investigator: Dr. Manoj Mahimkar

Overview

Mahimkar laboratory focuses on understanding the genetic basis of tobacco-related cancers by studying genomic alterations in copy number across the genome and identifying genes/ gene clusters underlying the altered genomic loci. Signatures associated with the progression of pre-invasive lesions to invasive oral squamous cell carcinoma have been identified, and candidate driver alterations unique to primary tumors with lymph node metastasis and related to patient survival have been established. In parallel studies, the chemopreventive efficacy of polymeric black tea polyphenols (PBPs), abundantly found in black tea in inhibiting carcinogen-induced lung adenomas in A/J mice and oral cancer in hamsters, is being tested.

Research

Research in this Laboratory has led to the identification of signatures associated with the progression of pre-invasive lesions to invasive OSCC and established candidate driver alterations unique to primary tumors with lymph node metastasis related to patient survival. Integrative analysis of genomic, transcriptomic and methylomic data revealed the specific signature of differentially methylated promoters and gene copies associated with shorter survival. Validating targets with real time PCR based analysis revealed ANO1 (11q13.3) and DVL1 (1p36.3) to be amplified in more than 90% of the cases. The association of these targets with survival will help establish prognostic biomarkers for shorter survival. Limited studies have explored clinically relevant biomarkers predictive of EGFR-targeted therapy response, which can guide treatment decisions in HPV-negative HNSCC patients. A study from this Laboratory shows the prognostic and predictive significance of nuclear HIF1α expression. Analysis suggests that nuclear HIF1α expression is an independent negative prognostic factor in HPV-negative HNSCC patients. Adding nimotuzumab to CRT significantly improves the clinical outcomes in high HIF1α expressing patients. HIF1α status showed significant qualitative interaction with treatment effect. EGFR or pEGFR expression or EGFR gene copy number did not have any prognostic or predictive significance in these patients. Studies in

this Laboratory on the chemopreventive efficacy of polymeric black tea polyphenols (PBPs), abundantly found in black tea, have shown to inhibit carcinogen-induced lung adenoma in A/J mice and oral tumors in hamsters. PBPs exhibit chemopreventive activity by modulation of xenobiotic metabolizing enzymes decreasing BPDE-DNA adducts (anti-initiation) and inhibition of carcinogen-induced inflammation, cellular proliferation, and induction of apoptosis possibly via modulation of signaling kinases (anti-promotion).

Education

The Principal Investigator is a recognized guide for Ph.D. in Life Sciences at the Homi Bhabha National Institute. Presently- Ms. Mayuri Inchanalkar, Ms. Vaishnavi Nimbalkar, Mr. Zaid Shaikh, Ms. Rinal Chavda, and Ms. Sakshi Anchan are working towards their doctoral theses. The Laboratory participates in the Centre's training program, and in 2022 two trainees were accepted for their Master's dissertation, while 4 for experience training.

Carcinogenesis, Genome Biology, and Precision Medicine Group

Dutt Laboratory

Principal Investigator: Dr. Amit Dutt

Scientific Staff (as per seniority): Mr. Dhananjay Kawle

Overview

Our lab investigates the somatic landscape of human cancers, particularly focusing on the genomic underpinnings of oncogenesis and progression in lung, breast, cervical, gallbladder, head and neck, and other malignancies. This deeper understanding of cancer's genetic drivers across diverse tissues holds the potential to inform broader therapeutic strategies and ultimately improve clinical outcomes for a wider range of cancer patients. We aim to uncover novel therapeutic vulnerabilities within these cancers by utilizing cutting-edge sequencing technologies and rigorous functional validation. Our ultimate goal is to translate these discoveries into next-generation targeted therapies, significantly enhancing clinical outcomes and offering renewed hope for cancer patients across a broad range of malignancies.

Service

Participate in weekly Molecular Tumor Board to discuss and interpret the molecular reports of patients at the Medical Oncology department to help decide appropriate therapeutic regimen based on the underlying genetic alteration. A study published in *JCO Global Oncology* (2022) from the lab evaluated the impact of a Molecular Tumor Board (MTB) on cancer management. Of 339 cases, 60.7% received therapy change recommendations, with a compliance rate of 58.5%. EGFR was the most common mutation among 646 identified. MTBs enhance access to targeted therapies and clinical trials.

Research

In oral cancer research, our lab identified *Fusobacterium nucleatum* as a key pathogen associated with inflammation and poor prognosis in early-stage HPV-negative tongue cancer. This work, published in *NAR Cancer* (2022), demonstrated that the presence of *Fusobacterium* correlates with overexpression of inflammatory markers such as IL1B, IL6,

and IL8, as well as miRNAs like hsa-mir-451a, hsa-mir-675, and hsa-mir-486-1. The findings revealed a distinct tumor subgroup characterized by elevated immune cell fractions, nodal metastases, and extracapsular spread, highlighting *Fusobacterium*as a potential biomarker for poor survival outcomes.

In lung cancer, our lab explored innovative treatment approaches and molecular insights. A study published in *Translational Oncology* (2021) demonstrated that weekly dosing of osimertinib, a third-generation EGFR inhibitor, effectively prevented the homing of EGFR-mutant tumor cells to the lungs in a preclinical mouse model. This dosing regimen showed comparable efficacy to daily administration, offering a potentially less burdensome therapeutic option. Another study published in *Translational Oncology* (2022) investigated low-frequency *EGFR T790M* mutations in lung cancer patients. Through next-generation sequencing, we identified previously undetectable mutations at allele frequencies below 5%. Functional analyses revealed that these mutations conferred significant resistance to erlotinib but remained sensitive to osimertinib, providing insights into extending osimertinib's utility in patients with disease progression.

In breast cancer research, our lab published findings in *Breast Cancer Research* (2022) that shed light on progesterone's role in modulating the *DSCAM-AS1/miR-130a/ESR1* axis. We found that progesterone suppressed cell migration and invasion by downregulating *DSCAM-AS1,* a long non-coding RNA. This pathway's activity was linked to better outcomes in PR-positive breast cancer and suggests a mechanism for progesterone's therapeutic effects.

Finally, the release of TMC-SNPdb 2.0, published in *Database (Oxford)* (2022), provided a comprehensive ethnic-specific germline variant database for Indian cancer patients. Incorporating data from 1800 individuals, this tool significantly reduced false-positive somatic mutations during cancer genome analysis, demonstrating its potential for improving precision oncology in diverse populations.

Education

The Principal Investigator is a recognized guide for PhD in Life Sciences of the Homi Bhabha National Institute. Presently 4 students – Mr. Sanket Desai, Mr. Asim Joshi, Mr. Bhasker Dharavath, Ms. Neelima Yadav, Mr. Suhail Ahmad, Ms. Supriya Hait, Mr. Aniket Chowdhury,

and Mr. Rudransh Singh are working towards their doctoral theses. During 2022, the Laboratory presented their research findings as invited oral presentations at more than 10 national meetings.

Staff achievements

Dr. Amit Dutt was featured among India’s top 75 scientists shaping the nation's future by the Department of Science and Technology in 2022. Dr. Ashwin Butle, a postdoc, secured the National Postdoctoral Fellowship and an Ad-hoc Scientific Officer position. Bhasker Dharavath won multiple awards, including the Sitaram Joglekar Award, Translational Science Oral Presentation, and travel grants for international conferences. Neelima Yadav received the Amity Best Oral Presentation Award and presented her work internationally. Sanket Desai and Asim Joshi earned accolades for their impactful cancer research, highlighting the lab's significant contributions to advancing cancer therapeutics and molecular understanding in 2022.

Therapy Resistance and Stem Cell Biology Group

Waghmare Laboratory

Principal Investigator: Dr Sanjeev Waghmare

Overview

The focus of this group is to unravel the molecular mechanisms that control both the adult stem cells and cancer stem-like cells regulation in human epithelial cancers. In particular, this group's effort is to elucidate the molecular signalling such as Wnt/Notch/Sonic-hedgehog and others, which regulate self-renewal and differentiation of stem cells. The group is using skin and human epithelial cancers such as head and neck cancer as experimental models. Thus, uncovering the molecular players that maintain cancer stem cells may pave a way for future clinical implications.

Research

Secretory phospholipase A_2 group-IIA ($sPLA_2$-IIA) is deregulated in various human cancers. $sPLA_2$-IIA catalyses the sn-2 position of glycerophospholipids that leads to fatty acids and lysophospholipids. Findings from this laboratory have shown that sPLA2-IIA knockdown in both the human oral cancer and breast cancer cell lines showed decreased tumorigenic potential. Further showed that, sPLA2-IIA knockdown resulted in decreased metastatic potential of breast cancer cell lines.

SFRP1 (Secreted frizzled related protein), a Wnt inhibitor is down regulated in various human cancers. This laboratory demonstrated that Cancer Stem-like Cells (CSCs) isolated from the Sfrp1 knock out tumors showed higher tumorigenic potential. Further, molecular profiling on CSCs revealed up regulation of genes involved in epithelial to mesenchymal transition (EMT) markers, Akt pathway, and also the stem cell marker, Sox2. The TCGA data analysis of the Western population has showed an inverse co-relation of Sfrp1 and Sox2 in human oral and breast cancer patient samples. To add to this observation, this laboratory has also showed a similar inverse co-relation in the Indian population for human oral and breast cancer patient samples.

Dab2 (Disabled-2 protein) is an adaptor protein that is involved in endocytosis of the receptors and also acts as a Wnt inhibitor. This laboratory showed that Dab2 knockout mice showed both decreased cell proliferation and skin stem cells. Further, skin induced carcinogenesis using DMBA/TPA in the Dab2 knock out skin showed decreased proliferation of the cells and the benign tumors do not convert into squamous cell carcinoma.

Oral cancer patients at an advanced stage have a poor clinical outcome. CSCs within the tumour escape chemo-radiotherapy leading to recurrence of disease, post-treatment. This group is investigating the molecular mechanisms involved in the maintenance of CSCs. The group has developed primary oral cancer cell lines from advanced-stage treatment naïve samples, and also from the orthotropic mice models. Thus the ongoing studies would provide insight into the molecular mechanism underlying the maintenance of these CSCs, which will be utilized to stratify responders and non-responders to chemotherapy.

Education

The Principal Investigator is recognized as a guide for the Ph.D. degree in Life Sciences under the HBNI. Currently, five students - Mr. Sushant Navrange, Ms. Sayoni Roy, Ms. Priyanka Joshi, Darshan Mehta, Sonal Negi, Akshay Paradkar and Tejashree Patel are pursuing their doctoral training. The PI accepted one dissertation trainee during the year. The group engages in weekly in-house presentations and journal club.

Therapy Resistance and Stem Cell Biology Group

Ray Laboratory

Principal Investigator: Dr. Pritha Ray

Overview

The focus of the group is to delineate the key molecular signatures associated with acquirement of resistance and metastasis in Epithelial Ovarian Cancer (EOC) and Gastric Cancer (GC). Research findings in 2022 have led to a deeper understanding of the role of different mutants of P53 in autophagy, platinum resistance and PIK3CA signalling, role of autophagy in maintaining chemoresistance and homeostasis in cancer stem cell (CSC) population, delineation of temporal dynamics of Notch3 signaling in real time and role of RUNX1 and ID in driving chemoresistance in EOC. Evaluation of the effects of herbal compounds in sensitive and 5-FU resistant GC and GCSC cells, molecular association between wtp53/mp53 with HER2 expression in GC cells and tumors is also being pursued.

Research

Among the important observations, linear activation of Notch3 pathway is dependent on the differential level of Jagged-1 expression in co-culture of EOC cells-fibroblast/cancer associated fibroblasts (heterotypic) and EOC cell-EOC cell (homotypic) which leads to VEGF and p21 upregulation has been showed. This is the first report of identifying VEGF and p21 as non-canonical targets of Notch3-Jag1 pathway. Monitoring differential activation of Notch signalling in different subtypes of EOC from Indian patient cohort is in progress. Elucidation of the mechanism of autophagy regulated ID-TCF12 axis in maintenance of platinum resistance of CSCs in EOC cells is ongoing; enhanced cisplatin sensitivity in 30% of a small group of HGSOC patients (primary and platinum-resistant) by an FDA-approved PIK3CA inhibitor (alpelisib) was detected. Besides PIK3CA gene amplification, a novel p53 mutation for HGSOC was identified by NGS in these responders. The detailed molecular mechanism of this mutant p53 driven PIK3CA-cisplatin sensitivity is being investigated. The association between various mp53 with autophagy, ROS, mitochondrial structure and function and role of ID and RUNX proteins in chemoresistance is under study. In the gastric cancer project, an association between p53

mutations in trans-activation domain and HER2 expression in tumor tissues and enhanced cell death by herbal compounds in sensitive and 5 FU resistant GC cells was seen. All these observations are now being investigated at the molecular level. The activation of VEGF and p21 by Notch3-Jagged 1 signalling imparted by homo and heterotypic cellular cross-talk is published in Cancers (MDPI).

Education

The Principal Investigator is a recognized guide for Ph.D. in Life Sciences of the Homi Bhabha National Institute. Seven Ph. D students –Mr. Pratham Phadte, Ms. Megha Mehrotra, Ms. Priti Shenoy, Mr. Sourav Chakraborty, Ms. Prerna Singh, Ms. Diksha Joshi and Ms. Sreyashi Nath are working on their doctoral dissertation. In 2022, Mr. Souvik Mukherjee completed his doctoral program. Students presented their work at conferences; Souvik in EACR 2022 Congress, Sevilla, Italy (20-23 June) and Sourav in HBNI TM-LS1 meeting, (best poster). The PI is actively involved: in ACTREC PhD course work; PhD interview for DAE-CBS and Mumbai University; external thesis examiner of NCCS, IIT (Hyderabad) and Calcutta university; Faculty performance evaluator for CBS-DAE, Mumbai university and is a member of doctoral committee (PhD) for ACTREC (10), IISER-Pune, NIRRH and BARC.

Therapy Resistance and Stem Cell Biology Group

Shilpee Laboratory

Principal Investigator: Dr. Shilpee Dutt

Overview

This laboratory is working towards understanding the molecular mechanisms that govern radiation and chemo resistance in Glioblastoma and Leukemia. For this, in vitro cellular models from primary patient samples and in vivo pre-clinical orthotopic mouse models that allows for systematic identification of signals and pathways that are relevant to resistance, thus providing the critical information necessary for therapeutic interventions have been developed. Collaborations with clinicians from TMH are active, to explore translational aspects of discoveries from this laboratory.

Research

Therapy resistance is a longstanding fundamental problem in cancer therapeutics and is addressed in this laboratory. A significant body of work in the field of Neuro-Oncology and leukemia has emerged over the years from this laboratory delineating molecular mechanisms of the way residual resistant cells and recurrent, survive chemo and radio therapy thus providing critical basic information necessary for therapeutic interventions in Glioblastoma and leukemia. In an important translational study, findings show, that similar to parent GBM, the recurrent GBM cells also elicit a competent DNA damage response (DDR) post irradiation. However, the use of apical DNA damage repair sensory kinase (ATM and/or ATR) is different in the recurrent cells compared to parent cells. Consistently, a differential clonogenic response of parent and recurrent GBM cells to the ATM and ATR kinase inhibitors with recurrent samples switching between these sensory kinases for survival emphasizing on the underlying heterogeneity within and across GBM samples was demonstrated. Together, recurrent tumours utilize an alternate DDR kinase to overcome radiation induced DNA damage was reported. Since there is no effective treatment specifically for recurred GBM patients, these findings provide a rationale for developing newer treatment option to sensitize recurrent GBM samples by detecting in clinics the ability of cells to activate a DNA damage repair kinase

different from their parent counterparts (Medical Oncology 2022). In a collaborative study a minimally invasive in-*situ* implantable hydrogel implant comprising transferrin-targeted temozolomide–miltefosine nanovesicles in the surgically resected GBM cavity (tumour bed) that improved drug penetration into the peri-cavitary region (~4.5 mm in depth) of orthotopic GBM-bearing mice was developed. Therefore, this system has potential to act as a bridge therapy in the immediate postoperative period before the initiation of adjuvant radiotherapy (Nanoscale 2022). Another collaborative study demonstrated that, targeted nano-delivery of chemotherapy via intranasal route suppresses in vivo glioblastoma growth, prolongs survival in the intracranial mouse model (Drug Delivery and Translational Research 2022).

Education

The Principal Investigator is a recognized guide for Ph.D. in Life Sciences of the Homi Bhabha National Institute. Presently 8 students (Anagha Acharekar, Saket Vatsa Mishra, Tejashree Mahaddalkar, Madhura Ketkar, Debashmita Sarkar, Bhawna Singh, Archisman Banerjee and Bhawna Kashid) are pursuing their doctoral thesis, 1 post-doctoral fellow (Dr. Saffiula Sayed Basha, DST-NPF) and 2 trainees are working in the laboratory.The PI delivers lectures for the core course and electives, and marks the assignments. The laboratory conducts regular data presentation and journal clubs. Laboratory members presented their research findings as oral and poster at national and international conferences in the report year.

Therapy Resistance & Stem Cell Biology Group

Nandini Laboratory

Principal Investigator: Dr. Nandini Verma

Overview

Triple-Negative Breast cancer (TNBC) has the highest prevalence among Indian women and is a major cause of breast cancer related death. As TNBC do not express targetable hormone receptors or human epidermal growth factor receptor-2, treatment of patients primarily relies on chemotherapeutic agents. Unfortunately, more that 50% of TNBC patients fall under refractory or partial responders with metastasis. Since there are no approved targeted therapies for drug resistant TNBC, improvement in chemotherapy response and better patient's outcome after treatment is one of the most desirable clinical prerequisites. Therefore, research in this laboratory is mainly focused towards understanding the cellular and molecular mechanisms that cause progression and therapy-resistance in different subtypes of TNBC.

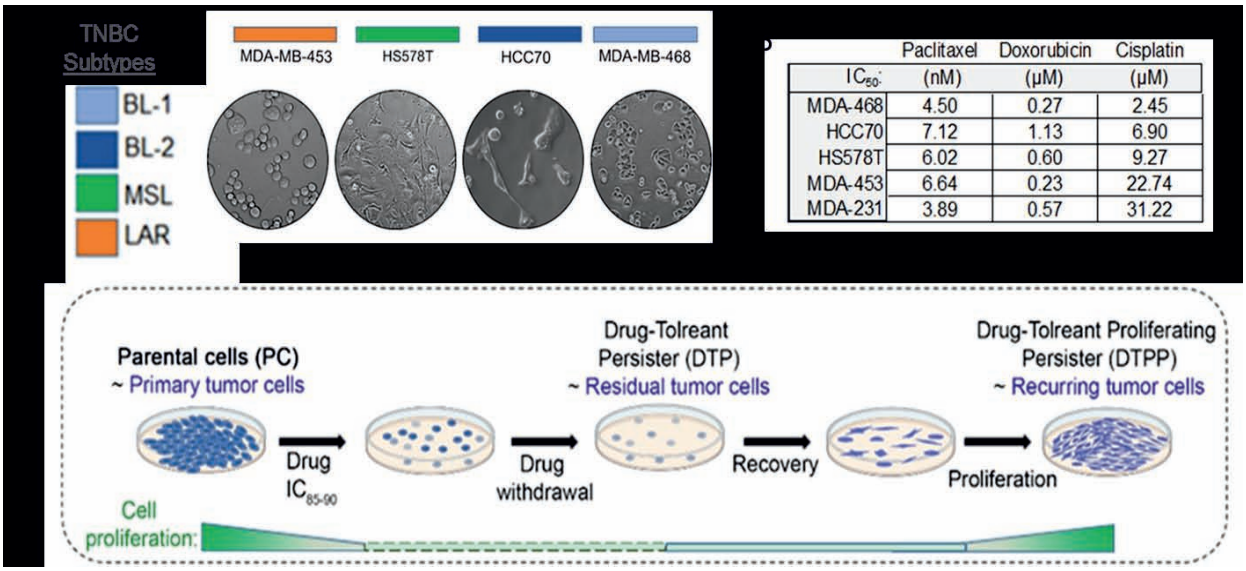
Research

Several recent studies in epithelial solid tumors have demonstrated that clinical resistance in primary and metastatic tumors evolves due to significant molecular reprograming during treatment, resulting in a drug-tolerant cellular state as an adaptive response to escape toxicity of therapy. This extensive molecular reprograming not only involves re-orchestration of the cellular signaling pathways, but might include alteration in epigenetic regulators, reprograming of tumor secretome, critical metabolic pathways and cross-talk of tumors to its microenvironment. TNBC is a very heterogeneous group of tumors with four distinct molecular subtypes with variable response to chemotherapy agents. The molecular basis of response and resistance to chemotherapeutic agents in different TNBC subtypes is not well understood. Lack of cellular and animal models that can precisely recapitulate the longitudinal molecular events responsible for deriving drug resistance and metastasis in different subtypes of TNBC is the main bottleneck in this understanding. In order to address this research problem, this laboratory has developed subtype specific cellular models of chemotherapy

resistance using different chemotherapeutic agents (Figure. 1) and characterized them for the phenotypic and molecular changes. Findings from this laboratory show that the drug-tolerant TNBC cells have significant increase in colonogenic potential, migration and invasion properties, changes in glutathione pathway and also, changes in several signalling pathways controlling cellular growth and motility. These cellular models will be comprehensively used to investigate TNBC subtype specific molecular, epigenetic, secretome and metabolic pathways that orchestrate the development of drug-tolerant state in cancer cells in response to chemotherapeutics. These approaches are expected to uncover novel drug resistance mechanisms and specific therapeutic strategies to re-sensitize chemoresistant TNBC tumors to cytotoxic therapies, to prevent tumor relapse.

Education

The PI is an HBNI affiliated PhD guide in Life Sciences. Three students, Ms Shagufa Shaikh, Ms Shivani Malvankar and Mr Kedar Sharma are working towards their doctoral theses. Four students for MSc dissertation and 2 undergraduates were accepted for training in the report year. Further, the PI: is a member of the academic committee at ACTREC and involved in the review, planning and execution of the annual academic activities; is a DC member for 3 Ph.D. students (ACTREC); 2 PhD students (External); participated in setting the question paper for JRF entrance examination 2022, ACTREC; delivers lectures in PhD course work modules at ACTREC; attended 4 conferences (including 2 international) with two of these being oral presentations.



IC_{50}:	Paclitaxel (nM)	Doxorubicin (μM)	Cisplatin (μM)
MDA-468	4.50	0.27	2.45
HCC70	7.12	1.13	6.90
HS578T	6.02	0.60	9.27
MDA-453	6.64	0.23	22.74
MDA-231	3.89	0.57	31.22

Figure 1. Development of Chemotherapy-tolerant cells from 4 molecular subtypes of TNBC. (A) Representative bright field micrographs of cell lines from different TNBC subtypes, colour bars indicate subtype.

(B) Table showing the IC_{50} concentrations of three major chemotherapeutic agents in cell lines of different TNBC subtypes.

(C) Schematics showing the derivation of drug-tolerant persister cell lines.

Cancer Theranostics and Clinical Pharmacology Group

De Laboratory

Principal Investigator: Dr. Abhijit De

Overview

Research in the De laboratory involves development and use of imaging methodologies suitable for estimating molecular functions *in vivo*. A wide spectrum of experimental medicine and novel concept therapeutics using non-invasive molecular imaging techniques in mice disease models are also being studied. The laboratory has the mandate to acquire diverse translational experimental therapeutics developed through research. In 2022, the laboratory received one Indian patent granted. The PI also served as Chairperson of PhD JRF program in Life science to promote Institutional goals.

Research

Optical reporter genes are integral in designing molecular imaging sensors for measurement of cellular /macromolecular functions in a live cell. Two molecular imaging sensors based on bioluminescence resonance energy transfer (BRET) principle, a core technology for understanding oncoprotein functions were designed by this laboratory. The two sensors were; reporter gene based to measure STAT3 protein, AKT and ERK activation and, a semi-synthetic sensor for in situ Caspase-3 protease target enhancement. STAT3 is a transcriptional regulator that controls important oncogenic signaling cascades in triple negative breast cancer (TNBC). Analysing patient tumor tissue samples revealed importance of phospho-serine post-translational modification as a measure of STAT3 activation in TNBC subtype. The Caspase-3 activation BRET sensor, developed in collaboration with IISER Pune was validated in cancer cells and a joint patent application was granted by Govt. of India in the report year. In 2022, the group worked with the AKT and ERK activation BRET sensors to reveal functional relevance of HER2 and HER3 dimerization domain mutations in trastuzumab resistance in breast cancer. Additionally, a humanized mushroom luciferase was developed as an optical imaging reporter and research for its utility in multiplexed reporter imaging for cancer gene expression is in

progress. Further, biocompatible gold nanospheres for photothermal therapy efficacy were tested and material developed in collaboration with IITB, Mumbai. Triggered precision treatment of palpable tumors with accumulated nano-sized particles when exposed to NIR laser confers excellent tumor ablation while keeping the surrounding tissue safe. The efficacy of this procedure against human drug-resistant and radio-resistant tumor was completed in mouse xenograft models of multiple types. The group has also collaborated (IIT B laboratory) to test novel drug formulation for treatment of pancreatic cancer, where Gemcitabine - thin film implant was tested in pancreatic mouse model using molecular imaging methodology. In 2022, this laboratory published one book chapter and six articles in peer-reviewed journals.

Education

The PI an Associate Professor, is affiliated to Homi Bhabha National Institute as a guide for Ph.D. degree in Life Sciences. In 2022, eight students- Pranay Dey, Aaiyas Mujawar, Chetna Patnaik, Mansi Joshi, Shivali Mishra, Sulagna Rath, Anuradha Gupta and Shaonlee Ghosh worked for their PhD thesis and one student, Sumit Mishra completed the PhD degree. The group met weekly to discuss results and research in the field. The PI has served in 3 international and 1 national journal editorial board. In the report year, members presented their research work in several national and international conferences, and 2 students were awarded for their presentations.

Cancer Theranostics and Clinical Pharmacology Group

Chilakapati Laboratory

Principal Investigator: Dr. Murali Krishna Chilakapati

Overview

Optical diagnostics, also often referred to as optical pathology, optical diagnosis, optical biopsy, spectral diagnosis, spectromics, describes applications of spectroscopic and/or optical based methods in disease diagnosis. Raman spectroscopy is one of the optical spectroscopy tools, been actively pursued for non-invasive, online clinical applications. Cancer is a leading cause of death predicted to cause, over 10 million deaths globally each year, with 70% deaths from the developing countries. The high mortality rate, is ascribed to limitations of conventional diagnostics. Hence the laboratory is pursuing in developing Raman based methods: (a) in vivo/in situ methods for routine screening and diagnosis; (b) minimally invasive micro spectroscopy methods using body fluids and cell smears; (c) Synthesis, optical and photothermal characterization of metallic nanoparticles for biomedical applications; (d) Exploring Raman and Infrared spectroscopy for oral cancer diagnosis using serum and saliva; (e) Investigations on experimental carcinogenesis in animal models and (f) Exploration of non-invasive and rapid biophysical methods to analyse treatment induced cytotoxicity.

Research

The laboratory's in vivo Raman spectroscopy studies on oral cancer demonstrated stratification normal, premalignant, malignant conditions, also identified early events (cancer field effects and malignancy-related changes). Early identification of recurrence/ second primaries and validation studies are done along with exploring utility of optical spectroscopy in disease free survival and other prognosis with help of multivariate tools. Raman studies on brush-biopsies and sera demonstrated stratification of healthy subjects, habitual tobacco users', oral premalignant subjects and subjects prone to second tumour/recurrence. Presently focus is on classifying different premalignant conditions and recurrence. Protocols for salivary Raman spectroscopy and demonstrated stratification of healthy, habitués and tumour subjects have been developed. Further, studies are being carried out to stratify premalignant subjects. Serum Raman spectroscopy studies of hamster buccal pouch models are being done

to evaluate utility of this minimal invasive tool in cancer applications and has demonstrated detection of early changes- by week 5th in the 14-week carcinogenesis model. Raman maps of tissues show feasibility of identifying tumor ablative effects/margins of photothermal-therapy. Further, RS could successfully assess radioresistance, chemoresistance, effect of CAP therapy, nanoparticle based targeted drug delivery and correlation between spectral and biomarkers. The Laboratory is also actively involved in exploring other Raman applications such as COVID detection, meningioma studies, pituitary studies, antibody resistance studies in cell lines, and trace analysis of pesticides.

Chilakapati Laboratory has several collaborative programs globally; BARC (Mumbai, Vizag), IPR Ahmedabad, IITs (Mumbai, Kharagpur, Dharwad), Mumbai University, BHU, University of Eastern Finland (Finland), Swansea University(UK) and Shimane University (Japan).

Education

The PI is affiliated to Homi Bhabha National Institute as a guide for Ph.D. degree in Life Sciences. In 2022, five students-Priyanka Jadhav, Panchali Saha, Parikshit Patel, Sampurno Banerjee and Sreeparna Nath were working towards the Ph.D. degree. Besides these external PhD students; E Duckworth (Swansea University, UK), Sebin Ausgustine (IPR, Ahmedabad), Dimple Saikia (IIT, Dharwad), Ajinkya Anjikar (Shimane University, Japan) and external Post-Doctoral students; Dr. Poonam Gavali (Post-Doc) and Dr. Mahesh Sayni (IPR, Ahmedabad) were working in this laboratory. In the report year the laboratory accepted 3 trainees for research experience.

Tumour Immunology and Immunotherapy Group

Kode Laboratory

Principal Investigator: Dr. Jyoti Kode

Overview

This Laboratory focuses on investigating innate immune markers, soluble factors landscape and immune evasion in acute myeloid leukemia (AML) and oral cancer patients; understanding the crosstalk of leukemia blasts and mesenchymal stem cells in AML bone marrow microenvironment. Immunomodulatory effects of ayurvedic formulation are being tested in a clinical trial on ovarian cancer patients. Anti-cancer and immunomodulatory effects of various phytoextracts are being studied for regulating innate immune mechanisms and immune-mediated cell cytotoxicity. This Laboratory has identified CD26, an immunoregulatory-enzyme and few immune subtypes as prognostic biomarkers for Graft-verus-host disease and other clinical outcomes post-allogeneic stem cell transplantation in cancer patients.

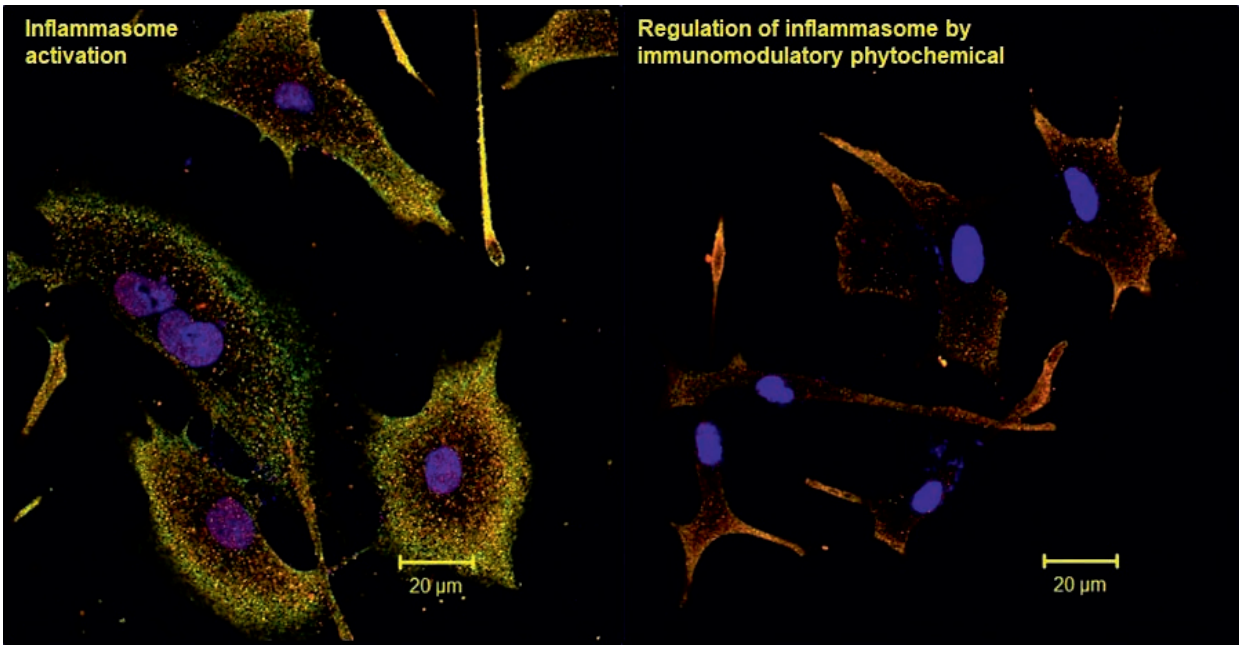
Research

Animal model of Graft versus host disease for understanding involvement of underlying immune mechanism demonstrated CD26 inhibitors delayed GVHD-associated mortality while two phytoextracts demonstrated, stable body weight, 100% survival and highly significant reduction in GVHD clinical score post allogeneic transplantation. NLRP3 innate immune pathway markers exhibited differential regulation in Oral cancer tumor versus adjacent normal tissues by immunohistochemistry and plasma samples tested with ELISA. One cell line and three Hu-mouse xenografts have been successfully generated from fresh tumor tissues derived from oral cancer patients to be used as pre-clinical models. Increased NLRP3 expression was observed in normal MSC co-cultured prior with AML cell line which was at par with that observed by inflammasome activation using standard activators. Transcriptomic analysis of oral cancer cells treated with **9a / 6-Shogaol** by RNA seq experiment exhibited involvement of regulation of NLRP3 pathway. In an ongoing phase II clinical trial in high grade serous epithelial ovarian cancer (OC), first phase of study showed interesting leads that Carctol-S treatment of OC patients augmented immune effector cells and abrogated

suppressive soluble mediators. Carctol-S and CARAF, two AYUSH compounds were found efficacious for *in vitro* anti-cancer therapy. Both were safe towards healthy cells with no immunotoxicity and enhanced immune-mediated cell cytotoxicity towards NK-sensitive target K562 and other solid cancer tumor targets.

Education

The Principal Investigator is a recognized guide for PhD Life Sciences of the Homi Bhabha National Institute. Presently, 3 students- Ms Shruti Kandekar, Ms Manasi Nagare and Ms. Akhila George are working on their Ph.D. dissertation. PI is a recognized co-guide for M.D and PhD Ayurveda, Maharashtra University of Health Sciences, (MUHS) Nashik and National Institute of Ayurveda, Jaipur, respectively and is mentoring 2 students. In the report year (2022) this Laboratory and PI: have submitted 3 national patents and published one US patent; conducted 2 immunology awareness events on 'International Day of Immunology'; contributed to 2 public awareness events for lectures on Oral cancer research; reviewed PhD thesis (IIT, Madras); reviewed PhD topic approval (NIIH, Mumbai and Amity University, Panvel) projects submitted to SERB, GoI, New Delhi and RGSTC, Govt of Maharashtra, and YIPB, KBC, Govt of Kerala; An image from the laboratory data was selected for, "Science as Art" in a recognized newsletter of NIH-FDA Immunology Interest Group, USA; Twelve students were trained and Laboratory members participated in 11 national (sixteen presentations) and 3 international (six presentations) conferences.



Other Projects

Scientific Officer 'D': Dr. Sejal Patwardhan

Overview

The research focus of this group is to unravel the biochemical and biophysical cues encoded by tumor microenvironment to identify key regulators of cancer progression and metastasis. The current focus of this group is to investigate the role of extracellular matrix (ECM) remodelling in various facets of cancer biology including cellular mechanoresponse, cell-cell communication and metabolic rewiring together contributing to aggressive and therapy refractory disease. To study this, combinatorial approaches covering proteomics, genomics, cell biology and cellular biophysics have been employed to identify underpinning molecular mechanisms. In parallel, the group is also engaged in developing novel assays to measure cancer mechanoresponse and identifying circulatory biomarkers to prognosticate cancer metastasis.

Research

Matrix stiffening due to excess deposition and crosslinking of collagen fibres is a common feature of breast cancer progression. ECM stiffening governs the cells behaviour and fate in terms of cell morphology, cytoskeletal scaffolding, motility, cellular plasticity and stemness majorly by integrin and PI3K signalling. However, crosstalk between this ECM and cancer cells and its fine-tuning by other signalling molecules remains largely elusive. The findings from this laboratory has led to the understanding that ECM rigidity modulates exosome secretion both qualitatively and quantitatively. The ECM-stiffness-tuned exosomes drive the motility and invasion of breast cancer cells via exosomal thrombospondin-1 engaging matrix-metalloprotease and focal adhesion kinase. Moving ahead, the influence of ECM stiffening on exosome biogenesis and trafficking pathways was also discerned. So far, the differential regulation of various ESCRT pathways in the exosome production have been probed. The molecular switch that allows preference of a particular ESCRT pathway over other in stiff ECM has been identified. We have also observed the role of specific Rab family proteins in the docking and release of exosomes in stiff ECM conditions compared to that of in soft ones. The

group is currently decoding the link of these pathways with the YAP/TAZ signalling, which is also found to be up regulated in stiff matrix conditions.

Another research area is to understand the novel role of exosomes in the invasion coupled metabolic rewiring of breast cancer cells in response to varying ECM conditions. Data obtained suggests that ECM-rigidity regulates mitochondrial dynamics in breast cancer cells, with increase in mitochondria number and upregulation of mitochondrial enzymes and protein markers. Concomitantly, ECM stiffness also decreases the pool of lipid globules in the cells, indicating reprogramming of mitochondrial and lipid metabolism. The laboratory is focused to further delineate the role exosomes in integrating cancer mechanobiology with bioenergetics.

Education

The Faculty is a recognized guide for Ph.D. in Life Sciences under the Homi Bhabha National Institute, and presently has two PhD students (Mr Shubham Jha, Ms Ritika Pant) working on their doctoral thesis. Seven trainees worked in the group during 2022, two for Master's dissertation, and five for experience. Group members participated in weekly in-house seminars and journal club, and presented their research findings at two conferences/ meetings during the year.

Other Projects

Scientific Officer 'D': Dr. Sharath Chandra Arandkar

Overview

The main aim of this laboratory is to understand the biology of the tumor microenvironment and focus on cancer fibrosis and its role in tumorigenesis and to decipher one of the major stromal cell types, Cancer-Associated Fibroblasts (CAFs) and their interaction with tumour cells, generation of CAFs in the tumour-microenvironment and identify the responsible extra & intracellular factors/signalling molecules in this process. Eventually, the plan is to develop new therapies to target the tumor microenvironment and cancer cells together.

Research

In the laboratory, different tumor derived cell lines and corresponding patient-derived Cancer-Associated Fibroblasts to address the tumor and stromal cell interactions are used. The preliminary experimental and bioinformatics data from NFs and CAFs led to few interesting projects. Data generated suggests that various stromal secreted factors influence various tumour cell properties. Currently, the focus is on Insulin Growth Factor Binding Proteins (IGFBPs) and TGFBI secreted from CAFs and their influence on tumor and its microenvironment. Additionally, the laboratory is studying Pancreatic Ductal Adenocarcinoma (PDAC), where TP53 mutations are abundant. One of the project addresses questions pertaining to cancer cell derived p53 mutations and its influence on PDAC tumor fibrosis and specifically CAF behavior. This project has generated various cell culture reagents to study PDAC cancer cell and fibroblast cell interaction.

Education

The Faculty attended; the All India Cell Biology International Conference held in Kashmir from September 5th-7th, 2022, presented work at Ramalingaswami & IYBA conclave organized by DBT, GOI, at Thiruvananthapuram between 30th November & 3rd December and participated

in the Young Investigator Virtual Meeting (YIM) 2022, India Bio Science. The Faculty is a recognized guide for the Ph.D. (Life Sciences) degree of the HBNI and teaches Tumor Immunology and Tumour microenvironment for the PhD course work at ACTREC. Currently, 3 graduate students – Ms. Ghanapriya Devi Yengkhom, Mr. Omkar Dhurat and Ms. Anamika Sen are working on their doctoral dissertation and 4 students trained in the laboratory during the report year.

Other Projects

Scientific Officer 'D': Dr. Rohan Khadilkar

Overview

The focus of the laboratory is to use Drosophila as a model organism to understand developmental questions and to model diseases like cancer. The current research focuses on understanding how stem cell – niche interactions are altered during disease conditions as compared to the developmental scenario.

Research

The current research aims of this laboratory are: to understand the mechanistic basis of cancer cachexia using Drosophila as a model organism, findings show- epithelial tumours have an active regulatory cross talk with the hematopoietic system and these tumours elicit an immune response in the organism which have been delineated using various techniques; to understand the effect of modulating cellular ageing in various stem cell, populations using Drosophila as a model, findings reveal - accelerating ageing in a stem cells specific manner has functional impact on both the intestinal stem cell system as well as the hematopoietic stem cells in the flies; Understanding the alteration in the stem cell – niche micro-environment in disease versus developmental situation, findings from the laboratory indicate that the signalling micro-environment in the stem cell – niche ecosystem is altered in a disease scenario as compared to developmental scenario.

Education

Presently two PhD students (Ms. Ujjayita Chowdhury and Ms. Mincy Kunjumon) are working in this laboratory. A total of ten trainees were selected for dissertation and experience in the report year. The Faculty is associated with the PhD program of the Centre and currently delivers lectures in modules of the Core and Elective Courses.

CRI - Research Support Facilities

Anti-Cancer Drug Screening Facility (ACDSF)

Officer-in-Charge: Dr. Jyoti Kode

Scientific Officer 'D': Dr. K Nirmal Kumar

The Anti-Cancer Drug Screening Facility (ACDSF) at ACTREC supports the efforts of anti-cancer drug development in India, with in vitro and in vivo drug screening assays that have been developed in-house. ACDSF has over 53 human tumour cell lines, 10 murine tumour models and 38 xenograft models for accomplishing drug screening. During the year 2022, 826 compounds were received from 90 clients, two of which were a corporate R&D and the others academic organizations, from 11 states across India. 783 compounds were tested for *in-vitro* activity. Twenty-one in-vivo studies comprising 43 compounds were screened for in- vivo efficacy experiments (12), tumor development studies (2) and MTD (07). Eight xenografts were developed and used for the same. In the report year, the facility also established a carcinogen-induced mammary cancer model that would serve as a model for chemo preventive screening studies.

The OIC has received two research grants from Ministry of AYUSH for conducting mechanistic studies to evaluate anti-cancer and immunomodulatory activities of three compounds; and one research grant from BARC, Mumbai for conducting mechanistic studies to evaluate anti-cancer, chemo-sensitizing and radio modifying activities of three compounds. Facility scientist had delivered an oral presentation at IABSCON-2022, Mysore. This Facility has contributed to one international peer-reviewed journal (publication), one US patent was published in the report year, and three national patents were submitted.

Bioinformatics and Computational Biology Facility (BCBF)

Convener: Dr. Prasanna Venkatraman

Board members: Dr. Kakoli Bose, Dr. Ashok Varma, Dr. Amit Dutt

Operator-in-charge: Mr. Nikhil Gadewal

Staff: Mr. Nikhil Gadewal, Dr. Gourab Das

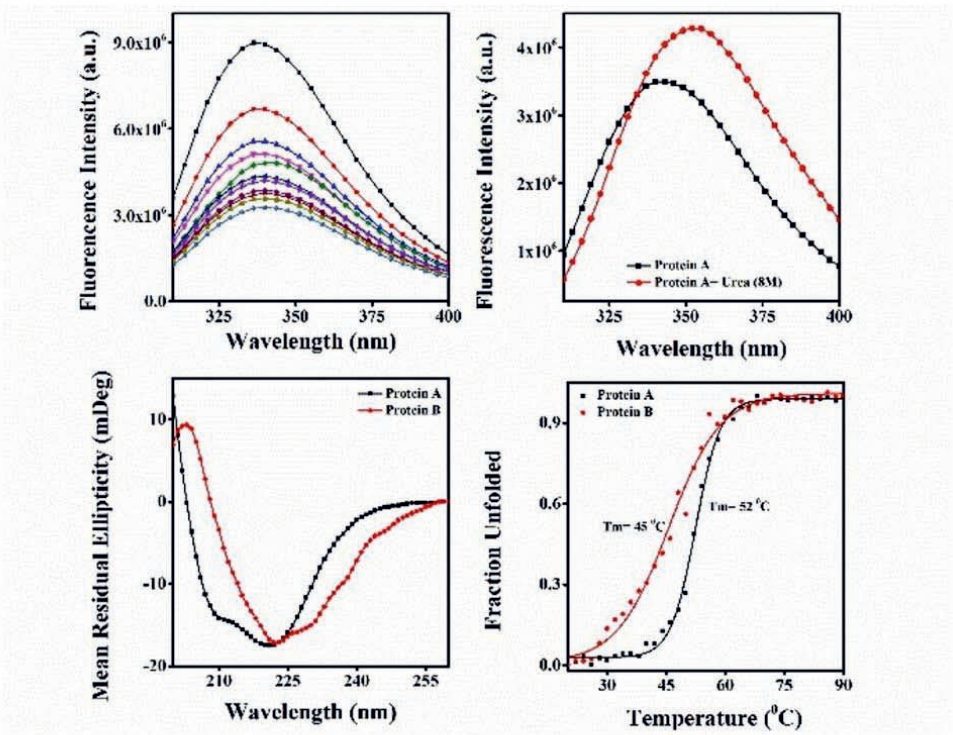
The Bioinformatics and Computational Biology Facility provides infrastructural and technical support to scientists and students to fulfil bioinformatics requirements in their projects. The major focus of the facility is a multi-omics analysis of genes, genomes, transcriptomes, proteins, proteomes, metabolites, metabolomes and other macromolecules using advanced statistical techniques of data analytics like unsupervised and supervised machine/deep learning, graph theory-based approaches to solve the basic problems of regression, classification, association mining etc. Additionally, in structural bioinformatics area centre provides the infrastructural and technical support for molecular docking and dynamics studies. The facility also develops and maintains in-house biological databases, web servers, and software, fulfilling a broad range of interests for the scientific community.

For molecular dynamics simulation studies, the facility is well equipped with one nVIDIA Tesla GPU workstation. For NGS-data analysis, access to the HPC cluster (3 compute nodes comprising 2TB RAM and 108 computing cores) is provided to various institute laboratories. Additionally, 2 workstations, 1 webserver and 7 PCs to meet the scientific demand of the users. Access to the cluster is provided for international workshops organised by Scientists at ACTREC for NGS data analysis. The facility provided short-term training (3-6 months) to 6 students in the B.Tech and M.Sc. program for their project dissertation.

Biophysics Facility

Officer- in-charge: Dr. Kakoli Bose

The ACTREC Biophysics Facility houses an extensive array of sophisticated instruments for *in vitro* molecular-scale characterization of biological macromolecules with accuracy and precision. The Facility provides services to various projects, enabling the characterization of the intrinsic properties of macromolecules and their assemblies (size, shape, folding, and stability) as well as of the interactions in which they are involved (stoichiometry, thermodynamic and kinetic parameters). The Facility is equipped with Jasco J-815 Circular Dichroism Spectropolarimeter, FluroLog -3 Modular Spectrofluorimeter, Dynamic Light Scattering (DLS) DynaPro Plate Reader II, JESS western blotting system, Octet BLI system for biomolecular interactions analysis and Prometheus NT.48 Nano Differential Scanning Fluorimetry (nanoDSF). Along with technically sound instrumentation, the Facility also provides, if required, expertise to assist users in experimental design and data interpretation. Subject to individual requirements, either an experiment is performed for the users or help is provided towards operating these instruments independently with minimal supervision. Training on Fluorescence Spectroscopy and Circular Dichroism is also being given to the in-house users from time to time. These services are also available for students, research scholars, and scientists from other academic institutions as well as industries on payment basis. During the year 2021-2022, besides in-house users, Facility services were also used by investigators and students from different DAE units, departments of Mumbai and other Universities as well as R&D and private organizations extensively. The Facility has generated around 1.2 lakhs INR as revenue in the last few years.



Biophysical Characterization of recombinant - expressed proteins using Fluorescence and CD

Biorepository Facility

Officer-In-Charge: Dr. Poonam Gera

ACTREC Biorepository Facility collects, annotates, stores, and distributes biological samples to in-house researchers for duly approved research projects. The biospecimens are collected from the Operation Theatre, Frozen room and Surgical Pathology as well as Breast-OPD. After obtaining the ethical consent from the patient's, tissue samples from 834 cases during 2022 have been accrued. A majority of these samples were Head and Neck tumors, followed by Breast tumors, CNS tumors and other tumor types which included Gastrointestinal and Gynecological. For all the possible cases paired normal samples were also collected and cryopreserved. In addition 68 core biopsy samples were collected from Breast OPD. Cryopreserved tissue samples were provided to 8 Principal Investigators with approved projects. Total distribution was 188 paired samples including prospective and retrospective distribution during the year 2022.

The OIC of the Biorepository Facility equipped with an expertise in Pathology is Co-investigator in multiple Projects at ACTREC and has published research articles in peer reviewed journals.

Common Facility

Officer-in-Charge: Dr. Sanjay Gupta

The Common Facility operation and maintenance offer supportive services like Chemiluminescence machines for all general gel documentation applications, multi ultra-pure water purification systems, a radioactive handling room for ^{32}P and ^{125}I, Bacterial Culture Hoods, fully automatic ice flake machines, and Cold Room facility for different research groups. All the facilities are well-equipped with sophisticated research equipment and situated on different floors and wings of Khanolkar Shodhika. In the year 2022, CRI-ACTREC added two water purification systems (Raphile) and two autoclaves (Jeol) through a DAE equipment grant to cater to the growing needs of researchers. Along with these, autoclaves and ovens in different research groups are also maintained by Common Facility technicians. The major types of equipment under the Common Facility are covered under an annual maintenance contract, and the process is to provide safe, sustainable, efficient, and reliable facilities.

Common Instrument Room (CIR)

Officer-in-Charge: Mr. Uday Dandekar

Over the past 45 years, the Institute has maintained a “Common Instrument Room” as a facility housing vital scientific equipment that are routinely required by the Centre’s staff and students, to optimize their utilization and make them available round the clock on all days of the week - including holidays. The Facility also provides technical guidance and support to various research laboratories in the procurement and maintenance of their capital equipment. Technically qualified staff members attached to this Facility handle routine maintenance of all the equipment and render help to the end users, thus ensuring proper use of the equipment. Requisite spares for centrifuges, low temperature freezers, CO_2 incubators, and consumables like centrifuge tubes, thermal paper rolls, are procured on a regular basis and stored as stock in the Facility to reduce downtime of the equipment. In all, 112 numbers of equipment are currently housed in this Facility. Equipment like Centrifugal Vacuum Concentrator System (Indigenous make), Multi-block Thermal Cyclers, Refrigerated Shaker Incubator (Indigenous make), Bioruptor Sonicator, and UV Visible Spectrophotometer have been procured and installed.

Digital Imaging Facility

Officer-in-Charge: Dr. Murali Chilakapati

The ACTREC Digital Imaging facility (ADIF) is a state-of-the art Imaging Facility housing several advanced imaging platforms. At present, the Facility comprises of: **Confocal Microscopes;** Nikon AX confocal microscope (2022), LSM780 confocal microscope, Carl Zeiss (2014), Leica SP8 confocal microscope with STED super resolution application (2014) and 3i Spinning Disk confocal microscope (2014), **Widefield Microscopes;** Olympus BX63 upright microscope (2022), Zeiss, Axio Imager.Z1 upright microscope (2007), Leica DMI600B microscope, inverted wide field microscope (2014), and the Nikon, Eclipse T*i* inverted wide field microscope (2014), **Live cell Analysis System;** Incucyte S3 - Live Cell Analysis system with Incubation, Sartorius (2021).

The Imaging Facility provides researchers with the ability to understand, visualize and analyze localization/co-localization, interaction and dynamics of different proteins/organelles, stained in a variety of samples like adherent / non adherent cells, tissues, whole mounts and Drosophila organs, as well as it assists in studying the uptake/penetration of drug/ oil/ cream formulations in skin, tooth, and hair samples. This is accomplished using a variety of imaging technologies, including, Widefield, Confocal, Super-Resolution Stimulated Emission Depletion (STED) microscopy, as well Live Cell Imaging and Image Analysis. The Facility provides access to several workstations with software for image processing, analysis, and 3D image reconstruction like LSM 5, Image J, Axiovision, Zen Black 2008 and 2012, ZEN Blue, LAS AF, Slidebook6, NIS Elements, and Cell Sens.

The Facility has an online booking system for all the microscopes. Bookings are done one week prior to the required day of usage. The facility remains busy throughout the year and usage of confocal systems remains extremely high especially for the LSM780. The Upright microscope and Incucyte systems are equally busy.

The Facility staff offers instrument training, imaging and sample preparation assistance to in-house Faculty and students, as well as consultation, demonstration and explanation of microscopes in the facility to students and visiting scientists from other institutions. External users' coming from Private Institutions are charged a nominal amount for imaging their samples.

DNA - Sequencing Facility

Office-in-Charge: Dr. Pradnya Kowtal

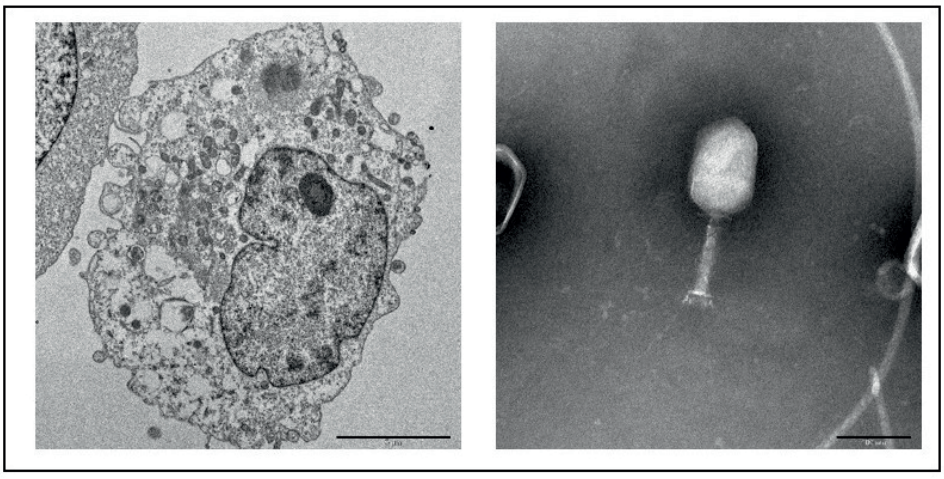
The DNA sequencing Facility has two automated sequencers - an eight capillary 3500 and a 48 capillary 3730 – Genetic Analyzers from Thermofisher. Both machines are used for DNA sequencing, fragment analysis and single nucleotide polymorphism analysis. The machines are operated by one scientific assistant. The average turnaround time to produce data is one working day after receiving samples. During the year 2022, the Facility carried out 1550 sequencing and fragment analysis reactions. The Facility was used by researchers from ACTREC, BARC and IIT-Bombay to study mutations and confirm cloning experiments. The Facility took part in the Open Day 2022. The working and principle of Sanger sequencing is explained by the Facility staff to students and visitors throughout the year.

Electron Microscopy Facility

Officer-in-Charge: Dr. Sorab Dalal

The Electron Microscope Facility at ACTREC is equipped with JEM 1400 PLUS, a Transmission Electron Microscope (JEOL, Japan) functioning at 120kV with magnification up to 12, 00,000 X and 0.2nm resolution. The Facility provides services for research and analysis of biological samples, nanoparticles, polymers, and other applications. The Facility carries out sample preparation for routine electron microscopy, including resin block making (solid tissues, monolayer cell cultures, and single-cell suspensions followed by ultrathin sectioning using Leica UC-7 ultramicrotome, contrasting, and imaging. The samples are analyzed for routine electron microscopy, negative staining, immunogold labeling, and EDS (Energy Dispersive X-ray Spectrometry). The Facility has analyzed 598 samples for electron microscopy for the year 2022. The Facility has carried out negative staining for 158 samples, including bacteriophages, fixed viruses, exosomes, nanoparticles, and polymers, and has also provided ultrathin sections to the users for immunogold labeling followed by the acquisition of images for 9 samples. For EDS, the Facility has carried out the acquisition of spectra for nanoparticles for 3 samples and analyzed them. The Facility helps the users in quantitative analysis using iTEM software and also interpretation on the basis of ultrastructural results. The Facility has analyzed 150 samples other than ACTREC and has 3 in - house publications.

Year	Total Samples Analyzed	Negative staining	Immungold Labeling	EDS	Outside ACTREC Samples	Number of Publications
2022	598	158	9	3	150	3



Flow Cytometry Facility

Officer-in-Charge: Dr. Sanjeev Waghmare

The Flow Cytometry Facility is a centralized facility, used by researchers and clinicians from ACTREC in analyzing and sorting cells in Flow-based experiments. The Facility extends technical support to students in their experiments for Fluorochrome panel designing, and interpretation of data. It also provides technical expertise in sample preparation and troubleshooting, whenever required. In 2022, the Facility was used by 99 scientists and students from a total of 27 laboratories.

The Facility is equipped with two analyzers [FACS Calibur (1 laser, 3 colors) and Attune NxT (4 lasers, 16 color] and two Cell Sorters [FACSAria-III (5 lasers, 18 colors) and FACSAria-I (3 lasers, 11colors)] which can perform 3-18 color analysis and up to 4 –way sorting respectively. The analysis is done using softwares - FACSDiva, CellQuest Pro, FlowJo, Attune NxT, FCAP Array and Modfit.

The research applications carried out on a routine basis include Surface and Intracellular staining like Immunophenotyping, DNA content studies- ploidy determination, Cell cycle analysis, S-phase detection by BrdU staining, Stem Cell Analysis- dermal stem cell analysis, Side cell population, Apoptosis studies, detection of mitochondrial membrane potential, Detection of fluorescence proteins like GFP Turbo Red , Functional Assays like proliferation assay, oxidative burst analysis, intracellular cytokine analysis, cytometric bead array assay for detection of cytokines, 4-way live cell and single cell sorting.

The Facility also offers its services to investigators from other academic Institutes and private organization on a payment basis. Demonstrations and training were conducted for visiting clinicians, scientists and students on request during the report period. A Hands-on Workshop on “Multicolor Live Cell Sorting” was organized by the Facility in collaboration with BD Biosciences from 26th – 27th April, 2022. The facility has initiated hands on training program (course work) for 5th and 6th year PhD students. Eighteen students have been trained by the Facility staff in the period of one year.

Histology Facility

Scientific Officer 'H': Dr. Arvind Ingle

The Histology Facility provides to the Centre, services comprising of : (a) slides of unstained/ haematoxylin and eosin (H&E) stained histology sections of animal tissues including bone/ tumor samples, (b) logistic support for frozen sectioning of human/ animal tissues, and (c) blocks of multiple tissues by pecking method using a microarray machine. During 2022, the facility received 5668 tissue samples in fixative and 346 human and 2514 animal paraffin blocks, and post- processing, supplied 5831 stained and 21911 unstained slides to 19 research laboratories. In addition, 261 tissues were processed for cryo-sectioning, and 143 H&E stained and 712 unstained slides were supplied to 16 research laboratories.

Laboratory Animal Facility (LAF)

Officer-in-Charge: Dr. Arvind Ingle

Scientific Officer 'E': Dr. Rahul Thorat

The Laboratory Animal Facility (LAF) aims to breed, maintain and supply laboratory animals to the research groups of the Centre. During the year 2022, LAF undertook planned breeding of 10 (normal strains), 2 (Nude), 2 (SCID), 1 (hybrid), 50 (Transgenic/ Knock-Out strains/sub-strains) of mice, 1 rat and 1 hamster strain, and supplied normal (2491), Nude (514), NOD SCID (2074) mice, 140 rats, 13 hamsters to 22 researchers against 75 IAEC-sanctioned research proposals. Towards quality control, LAF examined 423 stool/ animal samples and 1019 food, water, pulses, bedding material and room air samples for routine microbiological testing, 920 hair/ stool/ cellophane samples for clinical-pathology, 54 samples for serological detection of 4 rodent pathogens from 13 strains, and carried out PCR-based tests for 8 infectious agents using 62 random samples from 15 different strains. For genetic purity, biochemical marker testing of 40 mice from 8 strains, and PCR based tests for 20 microsatellite markers on 40 DNA samples from 10 mice strains; 21 microsatellite markers on 4 DNA samples from 1 rat strain was done. Skin grafting of 32 mice of 8 different strains and 4 rats of one strain was completed. Flow Cytometry was used to assess the T- and B-cell profile in 34 blood samples of Nude/ SCID mice, as also control BALB/c and Swiss mice. In the rodent germplasm freezing program, 23 Nude mice embryos are frozen in 2 straws; whereas rodent sperms of KO mice are cryopreserved in 20 straws. In 2022, LAF supplied normal (9367), Nude (672), SCID (348) mice, 100 rats and 846 hamsters as experimental animals to 27 CCSEA registered Indian organizations. The senior faculty accepted 4 MSc students for dissertation in 2022. The senior faculty has been nominated as College Council of ICVP; Chairman, Education Committee, ICLAS, served as Editorial Board Member of Chinese and Korean Laboratory Animal Science Journals; Section Editor of Laboratory Animals journal; Treasurer, LASA India; Ad hoc Specialist, AAALAC International, USA; Zonal Secretary (West Zone), IAVP.



Microinjection Facility -LAF



Swiss Bare Mouse Family

Macromolecular Crystallography and X-Ray Diffraction Facility

Officer-in-Charge: Dr. Ashok K Varma

Macromolecular and X-ray diffraction Facility has acquired and maintains an excellent Microstar Microfocus Rotating Anode X-Ray Generator, High Brightness Multilayer Optics, and Imaging Plate Detector for X-Ray Diffraction and also robotics for crystallization. The Diffraction Facility is functional and provides support to users from ACTREC and other institutions since the year -2012. Robotics for crystallization, installed and commissioned in the year-2022 is an additional support to the facility. The diffraction facility provides full support on crystallization and data collection to users from ACTREC and other neighbouring institutions. The crystal tested in home source has been nicely diffracted in synchrotron facility. The major users from ACTREC are members of the Bose, Prasanna, and Varma Laboratories. The workstations attached to diffraction facility are used for diffraction data analysis, structure solution and refinement. The required software's for data processing, structure solution and refinement are installed in the Workstations. On the occasion of "Azadi Ka Amrit Mahotsav" this Facility imparted training to research scholars/faculty. The Facility also provided offline training to research scholars JRF batch -2022.



Seen above is a student performing an experiment in the Facility

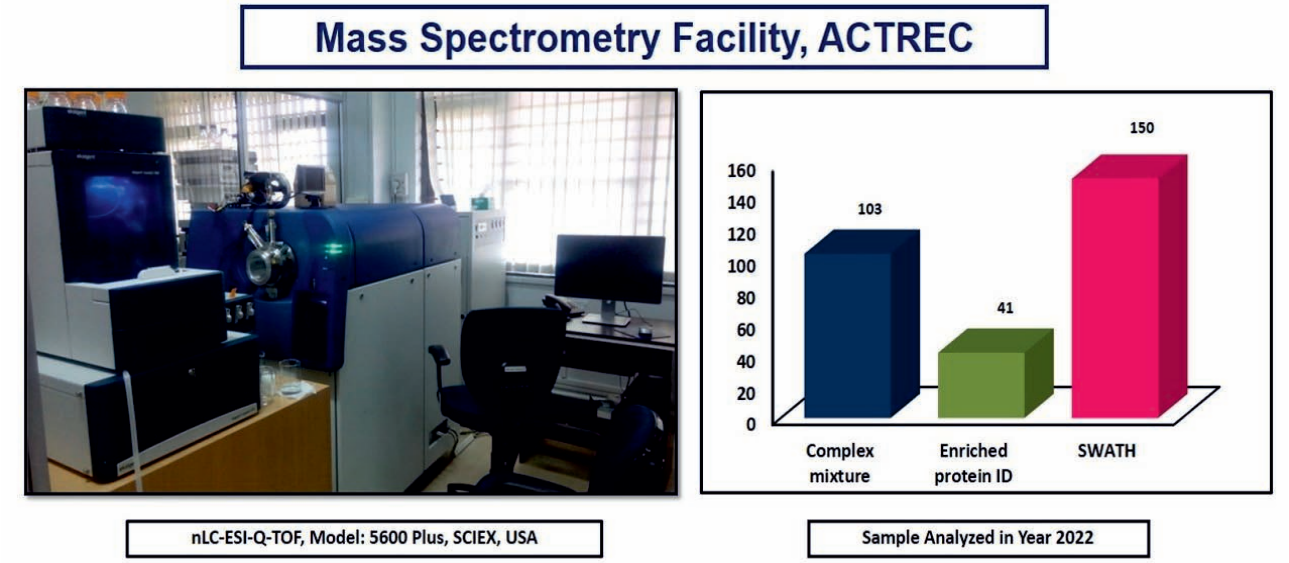
Mass Spectrometry Facility

Officer-in-Charge: Dr. Rukmini Govekar

Scientific Officer 'D': Mr. Shashadhar Dolas

Mass spectrometry facility at ACTREC houses a Nano-LC (ABSCIEX, Eksigent)-ESI-Q-TOF (ABSCIEX, Triple TOF 5600 plus) mass spectrometer. Varied applications such as, profiling of complex protein mixtures (103 samples), identification of enriched proteins (41 samples), and label free quantification (SWATH analysis) complex protein samples (150 samples) have been carried out on this platform.

The Scientific Officer attached to the Facility demonstrated the working of nLC-ESI-QTOF and data analysis to the JRF student's batch of the year-2022. As a coordinator, conducted 'One Day Workshop on Analytical, Functional and Structural Proteomics' on occasion of Proteomics Day-2022. Demonstrated the workings of the Facility to college students and delegates on celebration of 'Open Day ACTREC -2022. The faculty attended LC MS/MS training workshop at SCIEX, Bengaluru and a virtual Protein Discover Software training program during the report year.



Molecular Imaging Facility

Officer-in-Charge: Dr. Abhijit De

Established in 2013, Molecular Imaging (MI) Facility has completed 9 years successfully. This Facility provides extensive support to experimental evaluation of various facets in cancer biology, such as therapeutic delivery, treatment response, disease relapse, distant metastasis, material bio-distribution, autophagy and other research questions addressed. MI enables simultaneous visualization and quantitation of cellular processes at the molecular or genetic level in real-time, and has received world-wide recognition as a powerful tool for translating basic research findings to the clinic. Preclinical orthotopic xenograft models developed here are of important cancer types for human breast, brain, ovary, lung, pancreas and lymphomas. Besides the in-house investigators, faculty from institutions like BARC, IIT Bombay, and IISER Pune benefitted using this facility and thus expanded the scope of interdisciplinary research for ACTREC investigators in finding solutions for cancers of their interests. Altogether, 23 PhD thesis students (6 students in 2022) have completed their degree by using data generated from this Facility.

The Facility has one IVIS Lumina II and one IVIS Spectrum imaging system. Other necessary infrastructure accessories like gas anesthesia systems, data back-up and computer terminals for imaging data analysis were added for optimal operation using intramural as well as extramural funding supports received by involved investigators. The installed systems offer fast scanning of multiple mice or rats emitting photonic signals such as bioluminescence, near-infrared fluorescence and Cerenkov luminescence. The systems have integrated heated stage required for maintaining body temperature of mice during non-invasive scanning procedure; fast scan performance for photon signals primarily in the range of 500–800 nm from tissue culture plates or tubes or from inside the live mice sources can be captured. The excitation/ emission filters accommodate majority fluorescent dyes or fluorescent proteins in the green to near-infrared spectral range. Other important features of IVIS Spectrum system is spectral unmixing and 3D single-view, diffuse tomographic reconstructions (DLIT and FLIT mode) capacity. To date, the data generated from this Facility has led to many high impact publications in leading international journals and contributed in filing several Indian patents. The Facility regularly participates in educational visits organized by the institute.

Next Generation Sequencing Facility

[Cancer Genetics and Genomics Laboratory]

Officer-in-Charge: Dr. Rajiv Sarin

Scientific Officer 'E': Dr. Poonam Gera

This Facility at ACTREC undertakes comprehensive germline genetic analysis for inherited cancer predisposition using Next Generation Sequencing, Sanger Sequencing and MLPA. Comprehensive Germline NGS Genetic Testing services were started in this laboratory in May 2021. It is the only laboratory in any Government institution providing Comprehensive Germline NGS Genetic Testing services and serves as the National Referral Laboratory.

Along with the 26 gene Hereditary cancer panel, in 2022, two new NGS panels of 84 and 113 genes were standardized and introduced as a NGS test in service mode. The libraries were prepared in house and run on MiSeq/ NextSeq1000 machines at ACTREC. Sanger sequencing is offered as a patient service for 22 genes and MLPA for 10 genes. A total of 1644 samples were tested for NGS multigene hereditary cancer panels and 586 cases by Sanger sequencing in 2022. The NGS failure rate was <%1, thereby reducing wastage and cost per test.

The germline mutation spectrum in terms of the genes mutated and type of mutations in consecutive cases and the genotype – phenotype correlation has been presented in genetics and oncology meetings and the knowledge (data) shared has helped other laboratories to develop and validate their tests and in variant reclassification. A two days hands on workshop for NGS workflow was organized which has benefited many beginners for initiating studies and already established laboratories to address queries of trouble shooting.

Small Animal Imaging Facility

Scientific Officer 'G': Dr. Pradip Chaudhari

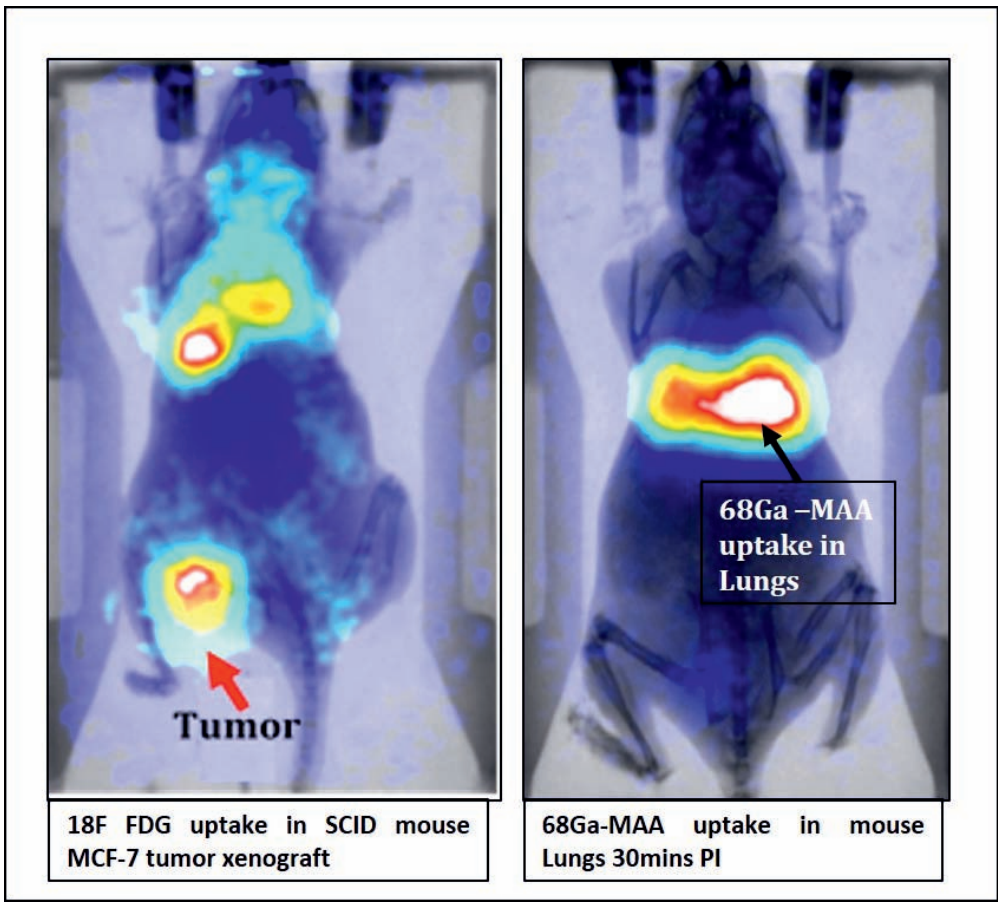
Scientific Officer 'D': Dr. Kiran Bendale

The major research focus of this Facility is on preclinical animal imaging and research on radiopharmaceuticals. Various diagnostic radionuclides such as Technetium-99m, and Fluorine-18 complexes are evaluated for their utility in imaging and monitoring cancer xenografts in various mouse models. Several PET, SPECT and CT studies involving rodents are performed for research projects from ACTREC, other DAE units, academic institutes and pharmaceutical industries. The Facility is also involved in diagnosis and treatment of pet animals diagnosed with spontaneous cancers. These cases are being referred to animal oncology clinic for further management. During 2022 (Jan-Dec), 242 referral cases underwent major or minor surgeries, single or combination drug chemotherapy and radiation therapy or a combination, as per the clinical requirement. The biological specimens were preserved in the animal cancer bio-repository for comparative research. **The research focus of this Facility is to deliver complete cancer care for pet animals suffering from spontaneous cancer and develop focused research areas on comparative aspects of animal and human cancers. Animal cancer bio-repository maintains biological material, which is received during the course of diagnosis and treatment. Bio-repository has fresh frozen tissue, blood, formalin fixed tissue and FFPE tissue. These animals are seen as a suitable alternative model system because of closer proximity to humans.**

The small animal imaging facility is utilized for preclinical PET, SPECT and CT imaging by various basic and translational research scientists from within and outside ACTREC. Eleven studies; majority being proof-of-concept studies, normal tracer uptake studies and in vivo tumor uptake studies wherein the expertise is in designing imaging protocols, development of animal models, data quantitation and analysis, have been initiated. The research component in preclinical imaging is validation of xenograft mouse model using preclinical imaging modalities PET and SPECT. In 2022 total 251 PET scans and 132 SPECT scans were conducted. **The Facility organized the 11th** Hands-on Workshop **on "In Vivo Preclinical Imaging and Drug Discovery" from December 15- 14, 2022.** This Hybrid workshop was attended by 210 national and

international delegates. On-site hands-on practical demonstrations were given to 18 delegates.

Six students were accepted for training in our Facility in 2022.



18F FDG uptake in SCID mouse MCF-7 tumor xenograft

68Ga-MAA uptake in mouse Lungs 30mins PI

CENTRE FOR CANCER EPIDEMIOLOGY

(CCE)

Dr. Sudeep Gupta	**(Director, ACTREC)**
Dr. Rajesh Dikshit	**(Director, CCE)**
Dr. Pankaj Chaturvedi	**(Deputy Director, CCE)**

Department of Preventive Oncology

Dr. Sharmila Pimple (OIC)

Dr. Gauravi Mishra

Dr. Subita Patil

Division of Medical Records & Cancer Registries

Dr. Atul Budukh (OIC)

Division of Hospital Based Cancer Registry and Patterns of Cancer Care

Dr. Amey Oak (OIC)

Dr. Sivaranjini. K

Division of Molecular Epidemiology & Population Genetics

Dr. Sharayu Mhatre (OIC)

Unit of Cancer Surveillance for Special Population (CSSP)

Dr. Ganesh B

Dr Rajshree Gaidhani

Unit for Strengthening Cause of Death Data (USCOD)

Dr. Rajesh Dikshit

Unit for Access to Affordable Cancer Care for One and All Project

Dr. Pankaj Chaturvedi

Department of Preventive Oncology

Professor and Physician (OIC): Dr. Sharmila Pimple

Professor and Physician: Dr. Gauravi Mishra

Associate Professor and Physician: Dr. Subita Patil

Overview

Department of Preventive Oncology is a designated WHO Collaborating Centre for Cancer Prevention, Screening and Early Detection (IND 59), Region SEARO, since 2002 with five main thrust areas:

In year 2022, Preventive Oncology Services were expanded to its rural spoke center at Khopoli, Raigad District Maharashtra State. Preventive Oncology provides services and conducts activities through its five main thrust areas:

- **Information, education and communication (IEC):** Programs for risk prevention, life style modification and improving health-seeking behavior such as Tobacco & Alcohol Cessation towards early detection of common cancers in India.
- **Cancer screening services: Clinic and Community-based:** Programs for Screening of Common Cancers and risk assessment for High-Risk cancers.

Table 1: New Registration at Preventive Oncology Services

Sr.No	Preventive Oncology Services	New Registration			Follow up registrations of OPD patients only
		OPD Based	Community projects	Total	
1	TMH Mumbai	5852	10502	16354	2498
2	Rural Spoke, Khopoli	4026	7116	11142	71
Total		9878	17618	27496	2569

- **Health manpower development:** 8470 health professionals were trained at TMH Mumbai and 155 were trained at Rural Spoke PO services at Khopoli, Raigad for organizing & implementation of cancer control programmes. Thus, total 8625 health professionals were trained.

- **Research & publications:** Total 15 research studies are ongoing for developing newer methods and strategies for the prevention and early detection of common cancers in India. Total 16 research papers were published in International [3] and National [13] indexed journals.

Table 2: Research & publications			
Sr.No	**Topic**		**Total**
1	Research		15
2	Publications	International - 3	16
		National - 13	

- **Advocacy, NGO-training and networking:** The department observed National Health Days and conducted various cancer control activities on those occasion.
- Special services: COVID 19 Vaccination Centre: Total 32,546 beneficiaries were vaccinated for COVID-19.

Service

a) Preventive Oncology Services:

The department provides Preventive Oncology services of screening & early detection of cervical, breast & oral cancers at OPD based and community based.

The OPD services are provided at TMH, Mumbai and Rural Spoke, Khopoli, Raigad, Maharashtra.

The new registrations under Preventive Oncology Services are as follows:

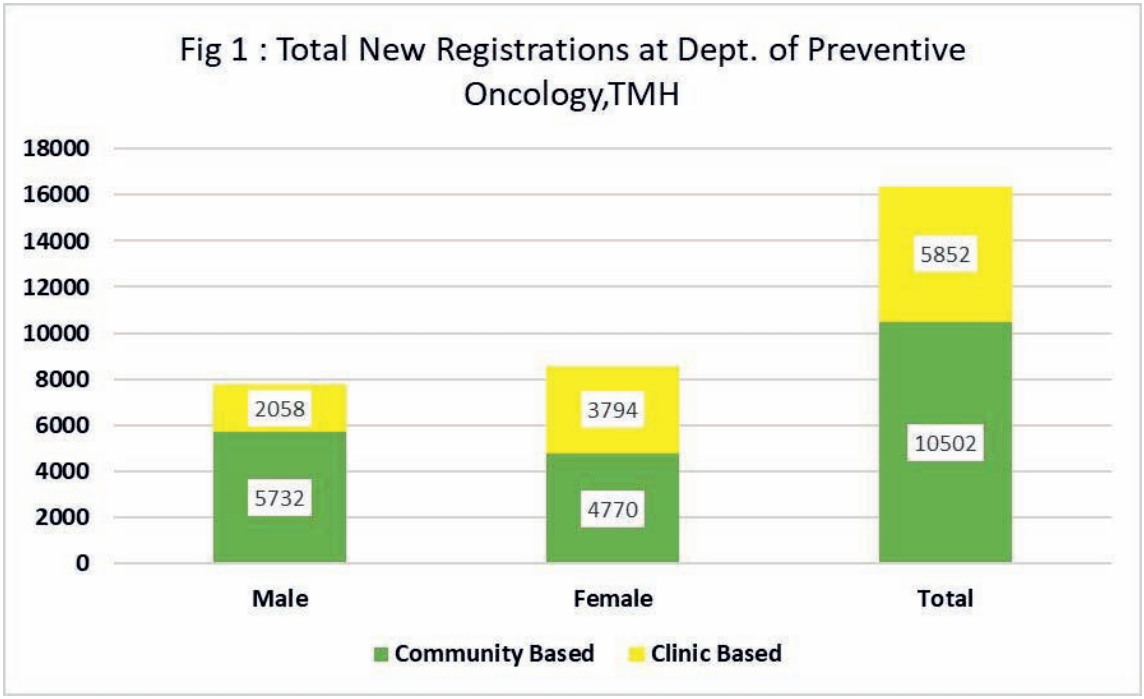


Fig 1 : Total New Registrations at Dept. of Preventive Oncology,TMH
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
2058
5732
3794
4770
5852
10502
Male
Female
Total
Community Based
Clinic Based

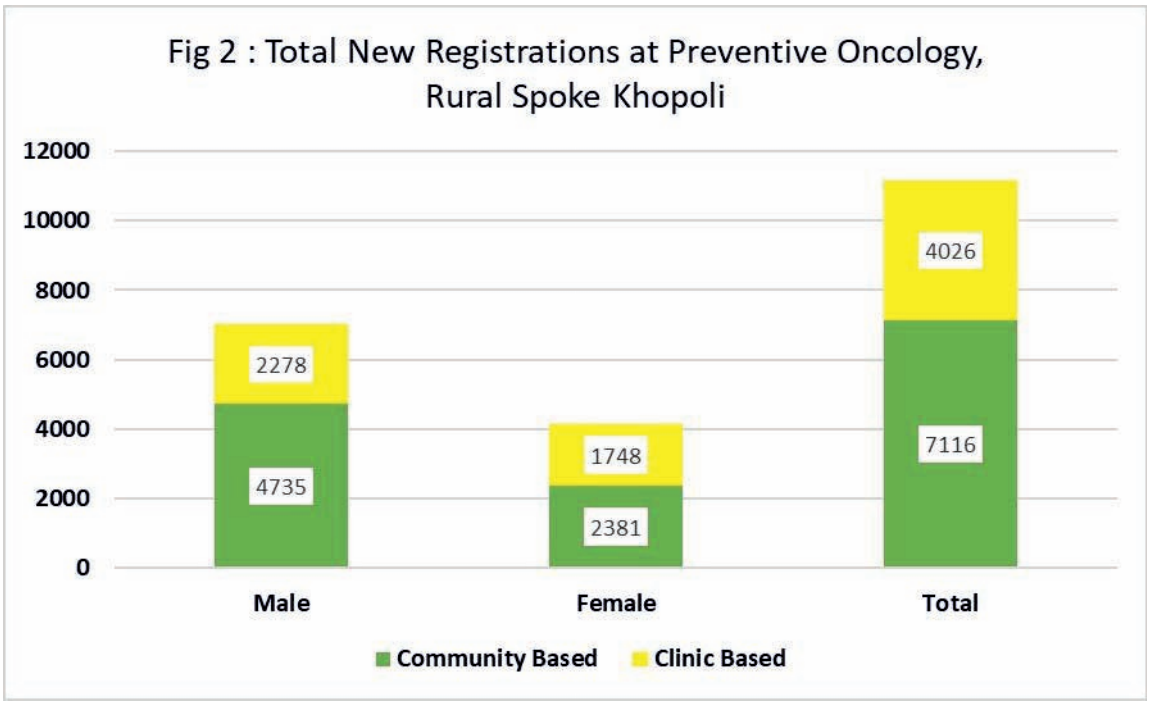


Fig 2 : Total New Registrations at Preventive Oncology, Rural Spoke Khopoli
12000
10000
8000
6000
4000
2000
0
2278
4735
1748
2381
4026
7116
Male
Female
Total
Community Based
Clinic Based

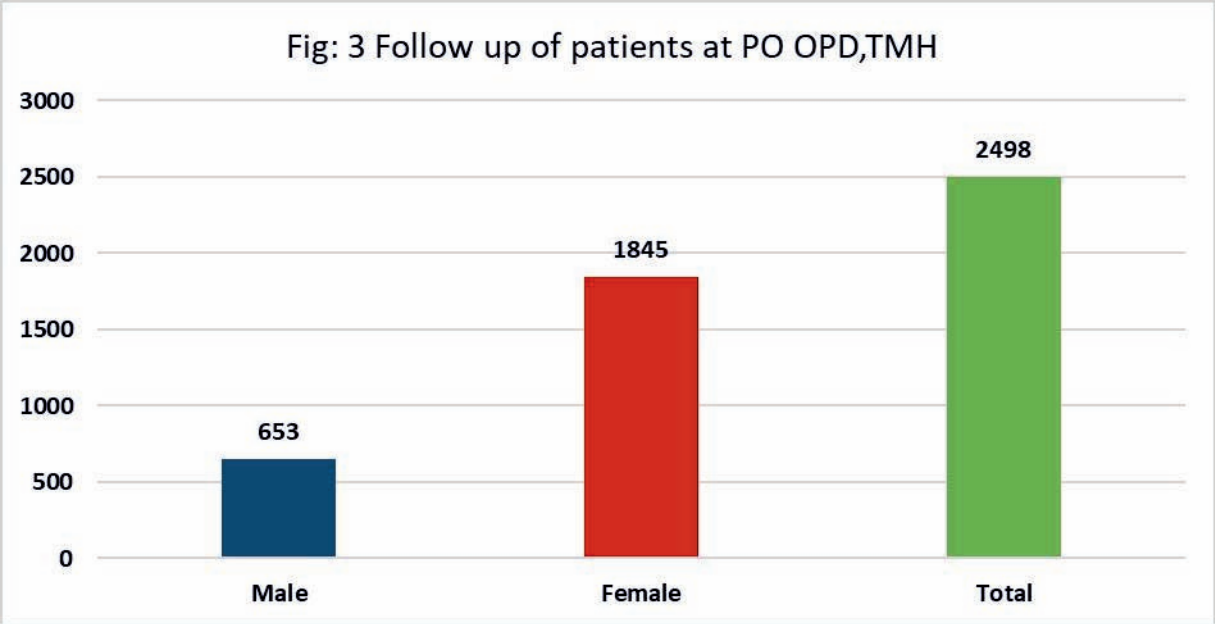


Fig: 3 Follow up of patients at PO OPD,TMH
3000
2500
2000
1500
1000
500
0
653
1845
2498
Male
Female
Total

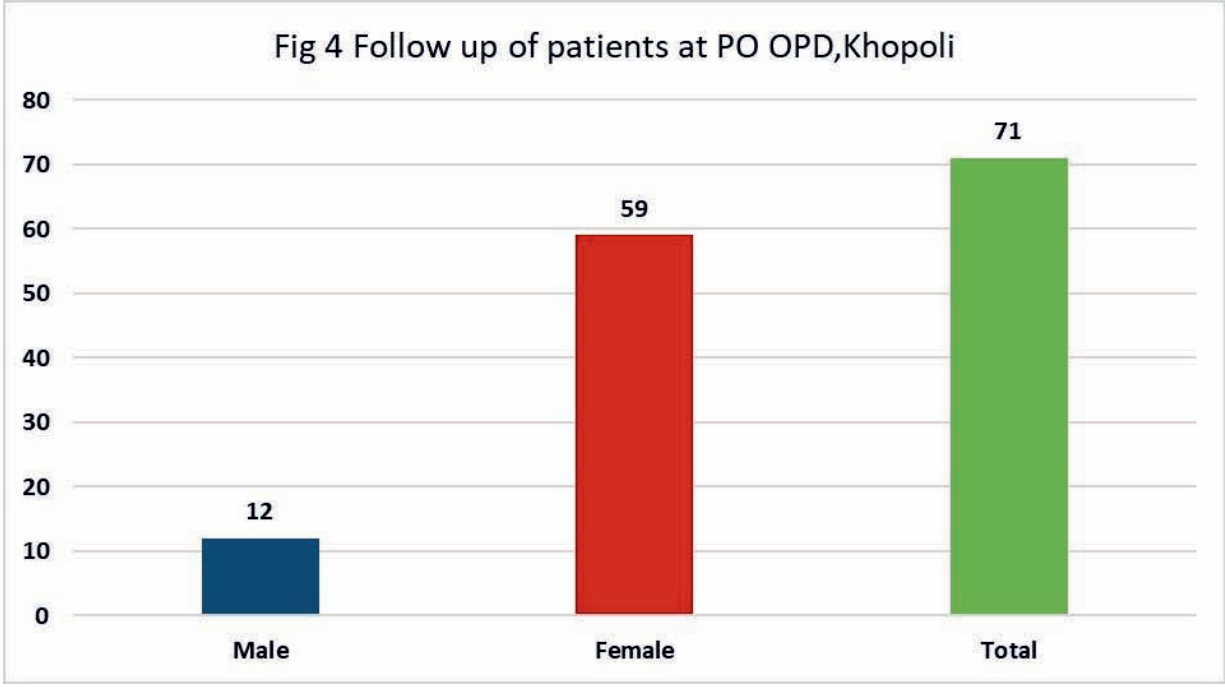


Fig 4 Follow up of patients at PO OPD,Khopoli
80
70
60
50
40
30
20
10
0
12
59
71
Male
Female
Total

Fig 5 : Oral,Breast and Cervical cancer screened in Preventive Oncology Services, TMH,Mumbai.

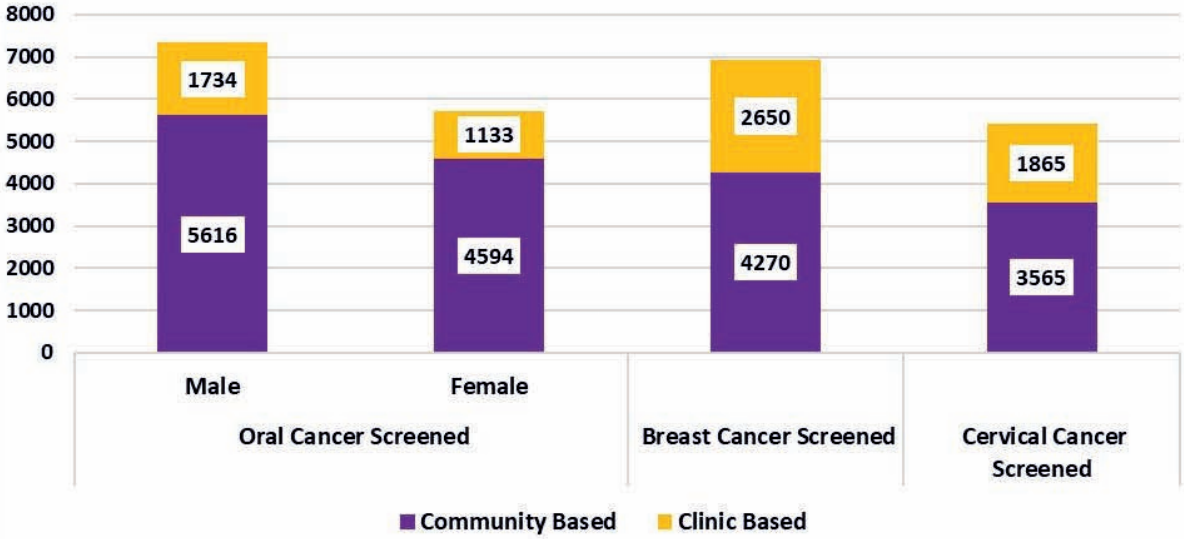


Fig 6 : Oral,Breast and Cervical cancers screened in Preventive Oncology Services,Khopoli.

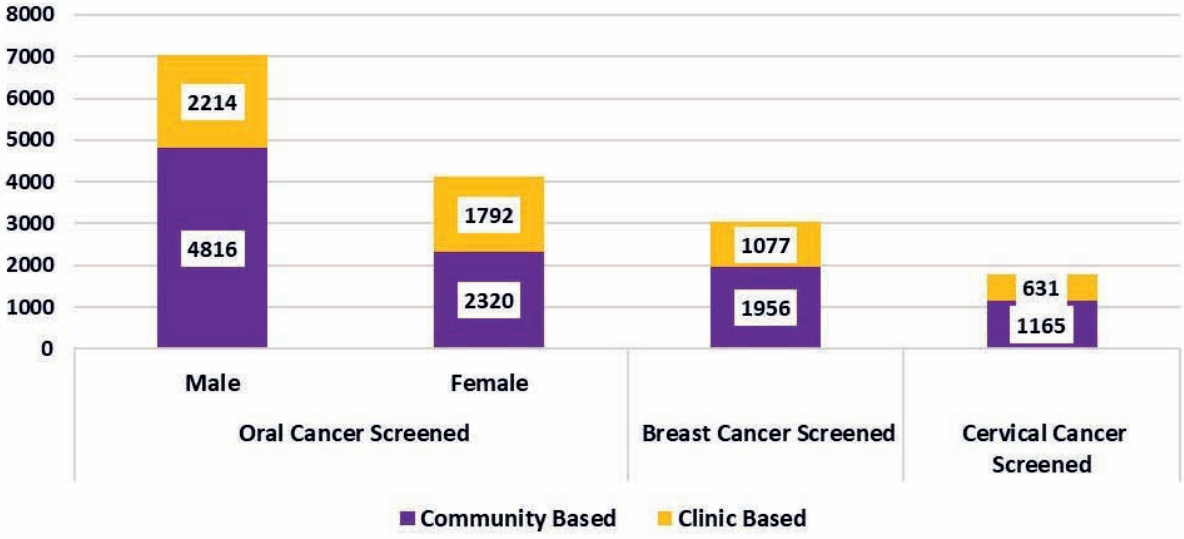


Fig 7 : Tobacco Cessation Clinic and Community outreach, Preventive Oncology, TMH, Mumbai.

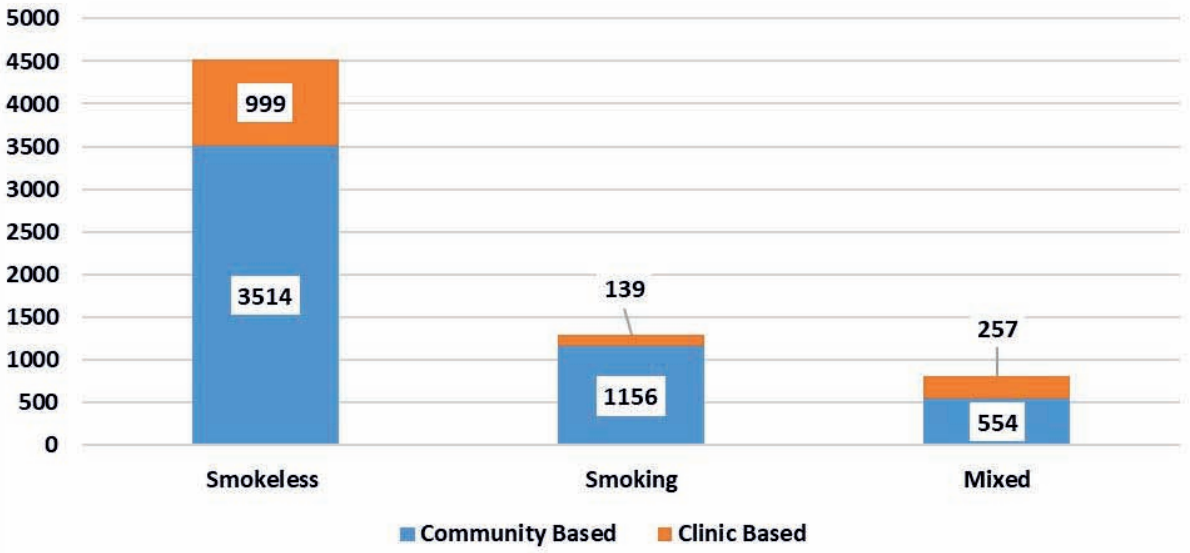
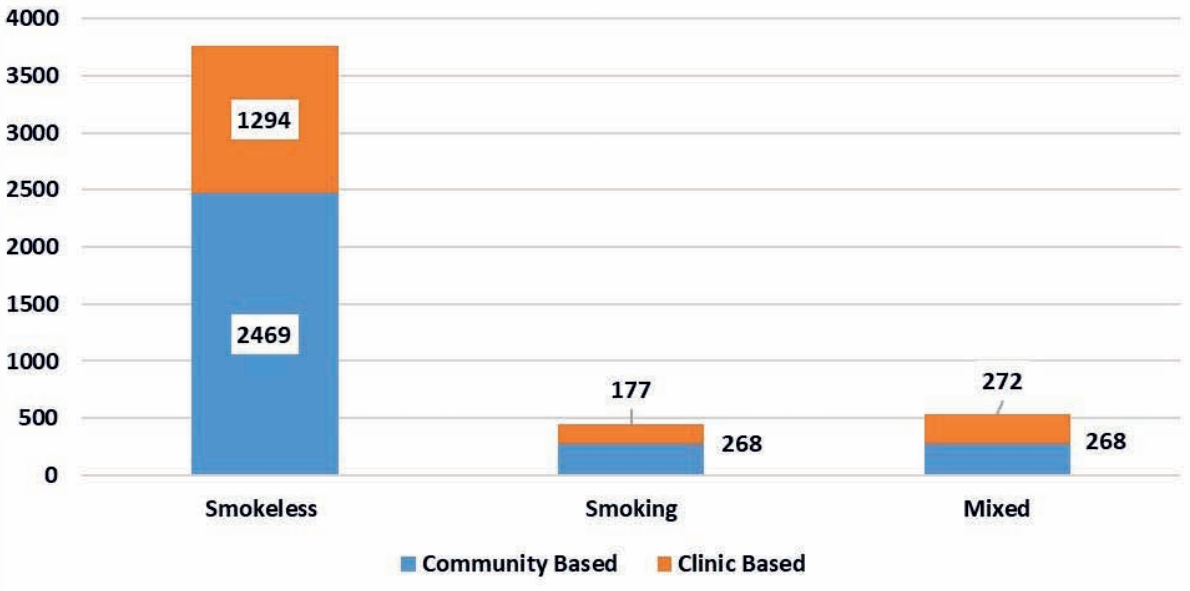


Fig 8 : Tobacco Cessation Clinic and Community outreach, Preventive Oncology OPD, Khopoli.



b) Outreach camps:

Table 3: Outreach Camps		
Through	No. of Outreach Camps	No. of Beneficiaries
Department of Preventive Oncology,TMH, Mumbai	13	909
Projects, TMH	847	10502
Preventive Oncology, Rural Spoke, Khopoli	83	7116
Total	943	18527

c) Awareness Sessions:

Table 4: Cancer Awareness / Education Sessions conducted			
Preventive Oncology Services		Total Sessions	Total Beneficiaries
A.	TMH, Mumbai & Project	2247	21020
B.	Rural Spoke, Khopoli, Raigad, Maharashtra	814	16635
Total		3061	37655

d) Special Activities / events:

- **Dissemination & Release Function of the Global Youth Tobacco Survey (GYTS 4 Maharashtra data:** The event of "Dissemination & Release Function of the Glob Youth Tobacco Survey (GYTS 4), Maharashtra data" was hosted by Tata Memori Centre, Mumbai. The Department of Preventive Oncology coordinated this event c 17 February 2022. The event was conducted in the hybrid mode, 125 attende onsite while 280 attended virtually. Following this there was a Press Release and CM on "Optimizing cancer care of oral, breast & cervical cancers at district hospitals".
- **Azadi Ka Amrut Mahotsav:** DAE Iconic Week Activities were conducted to observ "Azadi Ka Amrit Mahotsav (AKAM)" during 22nd Aug to 28th Aug 2022.

Table 5: Activities conducted under Aazadi ka Amrut Mahotsav			
Sr. No.	**Activities**	Total	
1	Capacity Building & Training Programme on Early Detection & Prevention of Cervical Cancer for MO, Staff Nurses, ANM, GNM & ASHA, Panvel Municipal Corporation.	Full day training programme	Total Number of Beneficiaries: 192

2	Cancer screening camps	Total numbers: 6	Total Number of Beneficiaries: 98
3	Cancer awareness sessions	Total numbers: 7	Total Number of Beneficiaries: 800
Total		13	898

Research

Table 6: Research On going and Completed during the year 2022			
Sr. No.	**IEC Project No.**	**Title of the Study**	**Funding**
Investigator Initiated			
1.	562	Randomized trial of 2 versus 3 doses of HPV vaccine in India - Extended follow-up of the participants of IARC-India HPV vaccination study to evaluate the effectiveness of one, two and three doses of Quadrivalent HPV vaccine in preventing cervical neoplasm	IARC
2.	1686	Acceptability and validity of self-sampling for high risk HPV detection among women in Maharashtra	Terry Fox
3.	3361	Primary screening of high risk HPV DNA by a low cost molecular HPV test for early detection of cervical pre cancers and cancers among women in urban and rural community of Maharashtra	Department of Health Research (DHR), Ministry of Health and Family Welfare (MoHFW)
4.	3450	Investigating Human Papillomavirus (HPV) Infection and HPV-associated Disease in Indian Men who have Sex with Men who are HIV-positive	National Cancer Institute
5.	3451	Incidence of Human Immunodeficiency Virus (HIV) among Indian Men who have Sex with Men (MSM)	National Cancer Institute
6.	3786	Preventing Cervical Cancer in India through self-sampling (PCCIS)	FIIT
7.	3826	Women Empowerment-Cancer Awareness Nexus (WE-CAN) : An Implementation Research Study of Cervical Cancer Prevention through HPV Self-Sampling and Education in India	GACD & ICMR
8.	3835	PRESCRIP-TEC: Prevention and Screening Innovation Project Toward Elimination of Cervical Cancer	Department of Biotechnology (DBT)

9.	1671	Performance of HPV DNA Test in presence of co-infection with common RTIs	Intramural
10.	3231	Collaborative Action for Control of Cancer and Other Non-Communicable Diseases among Mumbai Police" A/C No. 4842	Tata Trusts + Intramural+ CSR
11.	3239	Prevalence of Human Papilloma virus in Spouses of men diagnosed with Oral and Oropharyngeal Cancer	No Funding
12.	3875	A retrospective cohort study on the prevalence and determinants of Human Papilloma Virus (HPV) infection and Cervical Intraepithelial Neoplasia (CIN) and comparative evaluation of visual inspection with acetic acid, cytology and HPV testing as screening methods to detect CIN among women living with HIV/AIDS (WLHA) in Mumbai, India.	No Funding
13.	900803	Chemotherapy Associated Menstrual Dysfunction Study (CHAMS)	
14.	Service Programme	Oral cancer screening programme among high-risk population residing in low socio-economic settings in Mumbai, Maharashtra.	Service Programme
Sponsored Trials			
1.	3051	Protocol No. - SII-qHPV/IN-02 : A Phase-II/III, Partially Double-blind, Randomized, Activecontrolled, Multicentric Study to Assess the Immunogenicity and Safety of SIIPL's qHPV Vaccine Administered Intramuscularly in Healthy Volunteers According to a Two-dose Schedule to Cohort 1 (Girls and Boys Aged 9-14 years) and a Three-dose Schedule to Cohort 2 (Women and Men Aged 15-26 years) as Compared to Merck's HPV6/11/16/18 vaccine (Gardasil®)	Serum Institute

I) **Education: Conferences / training programs / Workshops / Webinars / CME / Seminars / Scientific Sessions conducted:**

Table 7: Educational programs			
Sr.No	Educational programs	No. of sessions	No. Beneficiaries
1	Training and capacity building program	20	5571
2	Scientific sessions conducted	22	8470
Total		42	14041

- **No. of observers: 80**

- **Invited Speaker / Panelist for Lectures / Guest Lectures:**
  - Total Number of sessions conducted: 46
  - Total No of Beneficiaries: 5536

VII. Glimpses of Activities conducted by Department of Preventive Oncology



Group Photograph - Fortnight training of Master Trainers Maharashtra Medical Officers Training in Preventive Oncology



Awareness Programmes-



Central Council of Research in Ayurvedic Sciences & Ayurvedic Cancer Research Institute



Mumbai Mobile Creches, Dharavi



Tembhipada, Bhandup



Bhavan's College, Andheri

Division of Medical Records & Cancer Registries

Professor Epidemiology and OIC: Dr. Atul Budukh

Overview

The section of Field Intervention and Cancer Surveillance was merged with the Department of Medical Records on 13th July 2021 and named as Division of Medical Records & Cancer Registries. The department is closely working with SERAO/WHO New Delhi as well as IARC/WHO, Lyon, France. The division provides technical support to the cancer registries in South-East Asia and regularly organizes cancer registration training programs for the South-East Asian region. The division also monitors the cancer burden through population-based cancer registries (PBCRs) in Punjab, Uttar Pradesh, Maharashtra, Andhra Pradesh and Bihar states of India. The division provides the Tobacco Quit Line service for the tobacco users who are willing to quit the tobacco habit. The division is also involved in the cancer prevention activities. The department is maintaining the medical records of TMH as well as regularly provide the services to patients regarding medical records.

The unit has played an important role in capacity building for cancer registries in India, Nepal, Bhutan, Sri Lanka, Myanmar, Timor-Leste and Indonesia.

Service

1. **Tobacco Quit Line (TQL):**

Tobacco Quit Line (TQL) centre provides effective counselling to the tobacco users and enables quitting tobacco through a toll-free number 1800-11-2356. In the year 2021, of the total registered 56,234 calls, 13,129 (23.3%) people were ready to quit tobacco and agreed to attend the regular follow-up calls. The counsellors made a total of 91,032 follow up calls, out of which 47,957 (52.7%) calls were attended by the clients. There were 2,916 (22.2%) quitters.

Activities conducted by the TQL Centre

- Regular Awareness visits to IPD and OPD of TMH and ACTREC
- Capacity building of state government staff of Tobacco Control Unit of several district of Maharashtra on “Tobacco Cessation Process and protocol of National Tobacco Quit Line Service”

- District-wise webinar for Tobacco counselors of Maharashtra state government.

2. Cancer registries under this unit:

Our unit is monitoring following population and hospital based cancer registries (PBCR and HBCR)

Sr No	Registry	State	Date of establishment	Population Covered	Report Status
1	Sangrur PBCR	Punjab	January 2013	1.7 Million	The annual report for the year 2017-2018 is ready.
2	Mansa PBCR	Punjab	April, 2013	0.8 Million	
3	Chandigarh PBCR	Chandigarh (Union Territory)	January 2013	1.0 Million	
4	SAS Nagar PBCR	Punjab	January 2013	1.0 Million	
5	Varanasi PBCR	Uttar Pradesh	April, 2017	3.7 Million	The annual report for the year 2018-2019 is ready.
6	Muzaffarpur PBCR	Bihar	October 2018	4.8 Million	The annual report for the year 2018 is ready.
7	Ratnagiri, PBCR	Maharashtra	February 2009	1.5 Million	2017-2018 year report is under process.
8	Sindhudurg, PBCR	Maharashtra	2010	0.8 Million	2017-2018 year report is under process.
9	Vizag, PBCR	Andhra Pradesh	June 2014	4.2 million	2017-2018 year report is under process.
10	HBCH Sangrur	Punjab	September 2017	-	The annual report for the year 2019 is ready.

11	MPMMCC and HBCH Varanasi	Uttar Pradesh	October 2019	-	The annual report for the year 2018 is ready.

3. **Technical backstop for strengthening population-based cancer registry (PBCR) in SEARO countries and building regional network for PBCR**

An agreement for performance of work between SEARO WHO and CCE TMC was made to provide the technical backup for strengthening PBCR in five countries (Nepal, Bhutan, Myanmar, Sri Lanka and Timor-Leste). This unit regularly provides technical support to the cancer registries from these countries.

Research

To study the challenges in implementing the government funded health schemes for the treatment of cancer patients in Tata Memorial Centre, Mumbai

This unit is studying the challenges in implementing health schemes for the cancer patients in Tata Memorial Centre (TMC). The objectives of the study are as follow:

- To study the challenges which are coming to the beneficiary while using the government-funded health schemes for the treatment of cancer patients in TMC, Mumbai.
- To study the challenges which are coming to the staff of Tata Memorial Centre while enrolling the patient into the government-funded health schemes and Philanthropic fund support for the treatment of cancer in TMC, Mumbai.
- To study the Out-of-Pocket Expenditure (OOPE) of the beneficiary who are taking cancer treatment under the government-funded health schemes in TMC, Mumbai.

Five hundred patients' and relatives were interviewed and the results will be soon published.

A Situational Analysis of Childhood Cancer Care Services in India – Conducted by WHO and ICMR – National Centre for Disease Informatics and Research (NCDIR), MoHFW, India

The survey is aimed to access the status of childhood cancer care services in India regarding availability, facility preparedness and capacity, Treatment-related practices and perceived

barriers and facilitators in diagnosis and treating childhood cancers. This unit has worked as a coordinating unit- nodal hospital of Maharashtra state and have worked on further identification of a representative network of three to five cancer treating hospital (tertiary level) and two to three district/sub-district hospital (secondary level). The report has been published and is available on ICMR website.

Early detection program for oral, breast and cervical cancer in Sangrur district of Punjab state

The objective of this project is to observe the effect of health education, easy access to diagnosis and treatment on stage at presentation, completion of treatment and survival of breast, cervical and oral cancer. Under this project, more than 49,000 households have been visited and nearly 200,000 population have been covered. Till now, 120 detection camps have been organized and 2,744 individuals have been screened. Out of these, 440 cases were screen positive and 23 precancerous cases were diagnosed and prevented. Moreover, a total of 65 cancer cases were detected including 39 breast, 14 cervix and 12 oral cases. These cases have underwent treatment and were followed-up at Homi Bhabha Cancer, Sangrur, Punjab.

Education

Virtual training programs were conducted by the unit under IARC Regional Hub for Cancer registration. Due to COVID-19 pandemic, virtual cancer registration training programs were organized for the participants from India, Bhutan, Nepal, Sri Lanka, and Timor-Leste. The list is as follows:

Training programs conducted in the year 2021:

Sr. No.	Name of the training program	Date	Number of participants
1	Workshop on setting up a cancer registry (Participants from Sri Lanka, Nepal, Bhutan, AIIMS Bathinda, AIIMS Gorakhpur, IGIMS Patna)	22.02.2021 to 27.02.2021	55

2	Training on cancer registration and CanReg5 operation (For the medical record staff)	02.08.2021 to 07.08.2021	14
3	Virtual workshop on solving the CanReg5 related queries for Bhutan, Nepal, Timor-Leste, and Afghanistan participants	10.08.2021 to 12.08.2021	15
4	Workshop on setting up a cancer registries (Participants from India and Sri Lanka)	04.10.2021 to 09.10.2021	83

Presentations in International meeting

1. A lecture on "Cancer Mortality Surveillance through Death Registrars" was delivered by Dr Atul Budukh on 12th November 2021 to the staff of the Colombo Cancer Registry.

2. Activities carried out by IARC regional hub Mumbai, India were presented by Dr Atul Budukh at the International Association of Cancer Registries conference held virtually from 12-14 October 2021.

3. Dr Atul Budukh was selected as a Master Trainer for the training programme to establish Pediatric Cancer Registries in Low- and Middle-Income Countries (LMICs). The course was virtually organized by International Agency for Research on Cancer, Lyon France for the period April to June 2021.

Team: Medical Records and Cancer Registries



Division of Cancer Care, Hospital Cancer Registries & Survival Studies, CCE

Officer-in-Charge: Dr. Amey Oak

Medical Officer: Dr. Sivaranjini. K

Overview

The two major activities carried out in this division are the Hospital Based Cancer Registry and Patterns of Cancer Care and Survival Studies. HBCR is functional since the inception of Tata Memorial Hospital while POCSS was initiated in 2007 in collaboration with NCRP, and ICMR.

Research

HBCR

- Information regarding socio demographic and clinical characteristics like cancer site, histology, diagnostic and treatment modality of 38080 cancer cases registered in 2019 was abstracted and submitted to ICMR. Leading cancer site among males and females was buccal cancer and breast cancer respectively.
- Socio demographic and clinical variables like cancer site and histology was also abstracted for 36885 cases registered in 2022.

POCSS

- Comprehensive clinical and survival data was abstracted for cancer sites like Head & Neck (3562), Breast (3593), Cervix (982), other gynecological (1215) and Hematolymphoid malignancies (1500).
- POCSS project was expanded to other TMC centers like HBCH Sangrur, MPMMCC Varanasi and HBCHRC Visakhapatnam in 2022. A total of 495 Head & Neck cancers were abstracted for Vizag TMC Centre for the year 2022.

Other activities

- In-house software for unified data entry of both HBCR & POCSS project was developed and implemented by Mrs. Sandhya Cheulkar, Scientific Assistant 'E' and linkages with various modules like MOIS, ROIS, OT, PABR, CIS were also carried out to minimize the duplication of work.
- Two publications one in an International titled "SARS-COV2 reinfection after previous infection and vaccine breakthrough infection through the second wave of the pandemic in India: An observational study" and the national journal titled "Epidemiological Review: Esophagus squamous cell carcinoma in India" were published.
- Hospital Based Cancer Registry report was published for the year 2018.
- Cancer awareness session was conducted for public personnel, CIDCO employee, population in PEN, Raigad district.
- Training session was provided to postgraduate medical students in TMC Mumbai, Vizag, M.B.B.S interns in Nair Hospital, Public health Officers in Nagpur, Pune on Medical Certification of Cause of Death data by Dr. Amey Oak and Dr. Sivaranjini K.

Education

- Ms. Monika Pravin Lokhande pursuing a master's in public health & Epidemiology and her dissertation title is "A Hospital-Based study of Survival in Oral Cancer patients of TMC, Mumbai".
- Mrs. Nikita Rajput pursuing her Ph.D. and her dissertation titled "Risk factors for Esophagus cancer".
- Cancer registry activities were explained to KEVAT students and AFMC doctors.
- Dr.Amey Oak and Dr.Sivaranjini K were awarded certificates for completion of the Online Colposcopy and Cervical Cancer Prevention course organized by IARC.

Division of Molecular Epidemiology & Population Genetics

Scientific Officer 'E' & OIC: Dr. Sharayu Mhatre

Overview

The main goal of the section is to conduct research in the field of Molecular Epidemiology and Population Genetics. The main thrust is on accurate measurement of exposures and investigates lifestyle, environmental and genetic risk factors for common cancer sites in India by using case control and longitudinal cohort study designs. The research methodology for Molecular Epidemiological studies at population level has been established by providing vigorous training to various centres of TMC.

Achievements:

- Establishment of automated biobank for storage of 3 million samples at -80c.
- Establishment logistic and processes (including software) for population-based studies.
- Establishment of pipeline and workflow for genotyping and sequencing of large number of samples.

Annexure 1: Extramural project

1. Genome-Wide Association Study to Identify Role of Genetic Susceptibility in Buccal Mucosa Cancer
2. Evaluating The Role of Genetic Susceptibility for Oropharynx Cancer in Indian Origin Population: a case-control study using the candidate gene approach.
3. Role of water pollution in development of esophageal cancer: a case control stratified by high and low risk regions.
4. Air pollution exposure measurement and cancer risk in India (ApEx-India).
5. Obesity and non-communicable disease in India: an imaging study of 10,000 adults in Barshi.

6. To elucidate geographical differences in the incidence of gallbladder cancer by identifying etiologically distinct types of gallbladder cancer through the study of mutational signature

Annexure 2:

1. Lifestyle and genetic risk factors for gallbladder cancer: multicenter case control study.
2. Development of breast cancer risk prediction model using lifestyle factors and polygenic risk score in Indian population.
3. Prevalence of Gallstone diseases in the regions with the high and low incidence of gallbladder cancer: status and future perspective for gall bladder cancer prevention.
4. Development of Cohort Study to Identify and Evaluate Transition in Lifestyle and Risk Factor in Rural Population.
5. Screening of 5 lakh women in North and Northeast and development of gall bladder randomized screening trial.

Division of Cancer Surveillance for Special Population (CSSP)

Project Coordinator: Dr. Ganesh B
Scientific Officer D: Dr. Rajshree Gaidhani

Overview

The Division was established in July 2021, for Cancer Surveillance of Special Population, under CCE. The division has in all 32 staff, including those at registry locations.

The mandate of the division are: 1) To setup and conduct studies on special population as special Registries, NPP cancer registries 2) Continue operations of present registries 3) Setup newer cancer registries in the upcoming NPP locations 4) Undertake epidemiological health surveys in the NPP, as requested as per the MOU between TMC-NPCIL Share the outcomes of the registry with DAE/NPCIL, Government for needful & to prepare and publish the registry reports.

Research

Population Based Cancer Registries (PBCR): First PBCR (Proposed setup in Ratnagiri NPP at Jaitapur), non-NPP location, setup in 2009, subsequently setup PBCRs in Sindhudurg (2010) and Visakhapatnam (2014). Subsequently 6 more PBCRs, Tarapur in Maharashtra, Rawatbhatta in Rajasthan, Kaiga in Karnataka, Kakrapar in Gujarat, Kudangulam and Kalpakkam in Tamil Nadu were set up in 2012. All registries are fully functional and data collection and reporting are done routinely.

Real-time data capture: As designed in Tablet-PC, registry data is collected real time and transmitted to the SERVER in CCE, ACTREC. The total number of cancer cases accrued in Nuclear Power locations registries are approximately 20,000, during the year. In the year 2022, data for the years 2017 and 2018 were collected, compiled, and published for all the Registries. Data for the years 2019-2020 for 4 registries are compiled, analyzed, and will be published shortly.

Health Survey: CSSP, as an expert advisor, designed, implemented the Health Survey in Rawatbhata in Nov 2022 and is ongoing. Periodical visit and checks were done on the project progress.

Publications: Four Population-based Cancer registry reports, of Tarapur, Kaiga, Kakrapar and Rawatbhata were published in 2022

Conferences: 1) 5 abstracts submitted to NAACCR conference were accepted and presented Online by Dr Ganesh B and Dr Rajshree Gaidhani.

2) 3 abstracts submitted to IACR conference were accepted and presented Online by Dr Ganesh B and Dr Rajshree Gaidhani.

Education

- Periodical Online Training and orientation were provided to the Cancer registry staff, every 3 months.
- Cancer Registry lectures were conducted for KEVAT students.
- Medical Certification of Cause of Death Course completed by Dr Rajshree Gaidhani
- First International Workshop on Strengthening Cause of Death Data Quality" on Dec 10,2022

Deputation: Visits to Tarapur, Rawatbhata and Kakrapar registries for review by Dr Ganesh B, Dr Rajshree Gaidhani & Mrs Mitali Sapkal

Unit for Strengthening Cause of Death Data (USCOD)

USCOD Leaders: Dr. Rajesh Dikshit, Director, Centre for Cancer Epidemiology, TMC

Dr. Pankaj Chaturvedi, Dy. Director, Centre for Cancer Epidemiology, TMC

The Centre for Cancer Epidemiology, Tata Memorial Centre established the Unit for Strengthening Cause of Death Data (USCOD) on 6th August 2021. The unit has received support from the Office of the Registrar General of India. The unit's resources comprise of an e-Learning course, manuals, pocket manuals, YouTube informational videos, face-to-face training of trainer workshops. More information on medical certification of cause of death (MCCD), civil registration and vital statistics (CRVS) and the overall activities of the unit please visit- https://tmc.gov.in/USCOD/Home.aspx and the USCOD YouTube channel- Unit for Strengthening Cause of Death Data - YouTube

The Unit develops resources on cause of death improvement activities, following World Health Organization and United Nations Statistics Divisions standards, builds capacity in cause of death improvement activities in Indian government and non-governmental agencies in cause of death activities, such as medical certification of cause of death, mortality coding (ICD 10 and ICD 11), implementation of Iris, production of vital statistics reports, etc., facilitates improvement in cause of death quality standards through advocacy efforts.

Overview of USCOD Activities-

Sr No	Activity	Month
1	Launch of the Unit of Strengthening Cause of Death Data (USCOD)	August 2021
2	Launch of the Medical Certification of Cause of Death (MCCD) E-Learning Course on Omnicuris	August 2021
3	First launch of the unit's website	November 2021
4	Launch of the USCOD Newsletter Volume 1	December 2021
5	Recruitment of new staff (liaison officer and country coordinator)	December 2021

6	Advocacy meeting with the office of EHO, Public Health Department, MCGM, Mumbai to facilitate the institutionalisation of the Mumbai Coding Team	January 2022
7	MCGM hiring the coding team on their pay roll and institutionalising the team	January 2022
8	Advocacy meeting with principal of Shri Krishna Medical College and Hospital, Muzaffarpur, Bihar for proposing training program for capacity building of doctors in MCCD and inclusion of the MCCD E-Learning course for interns and medical residents	February 2022
9	Advocacy meeting with principal of Darbhanga Medical College, Bihar for proposing training program for capacity building of doctors in MCCD and inclusion of the MCCD E-Learning course for interns and medical residents	February 2022
10	Advocacy meeting with Vice Chancellor of King George's Medical University, Lucknow, UP for implementation of training programs for MCCD and inclusion of the MCCD E-Learning course for interns and medical residents	March 2022
11	Advocacy meeting with officials at Sanjay Gandhi Post Graduate Institute for Medical Sciences, Lucknow, UP for implementation of training programs for MCCD and inclusion of the MCCD E-Learning course for interns and medical residents	March 2022
12	USCOD expert lecture at State Level Seminar on RBD Act, 1969 at SGPGIMS, Lucknow, UP	March 2022
13	Successive meetings with EHO, MCGM office for drafting of circular for making the MCCD E-Learning course mandatory for all government and private doctors in Mumbai	February 2022- March 2022

14	USCOD at National Workshop for Strengthening Cause of Death Data, WHO & CBHI	September 2022

Overview of Trainings Conducted by USCOD-

Sr No	Training	Location	Month	No of Participants
1	MCCD training of state government doctors with Public Health Department, Maharashtra	Jalna & Aurangabad	November 2021	45
2	MCCD Training of Trainers	Online from CCE	February 2022	44
3	MCCD Sensitization Workshop	Hybrid at SKMCH, Muzaffarpur, Bihar	February 2022	95
4	Face-to-face MCCD Training Workshop with support of State Government Medical Education Department, UP	Face-to-face at MPMMCC, Varanasi	March 2022	55
5	MCCD Orientation Training of Junior Resident Doctors	Face-to-face at KGMU, Lucknow, UP	March 2022	300
6	MCCD E-Learning Course	Omnicuris	August 2021-December 2022	9500 enrolled
7	MCCD Orientation Training of Junior Residents	Hybrid from Tata Memorial Hospital	April 2022	54

8	MCCD Training of Trainers Refresher Course	Online from CCE	June 2022	21
9	MCCD Orientation training for doctors of Andhra Pradesh State Health Department	Hybrid Andhra Pradesh State Medical Education Department	June 2022	330
10	MCCD Quality Assessment Workshop	Online from CCE	July	32
11	MCCD Orientation Training of Junior Residents	Face-to-face at Tata Memorial Hospital	August	51
12	State level advocacy meeting and MCCD ToT for state government doctors	Nagaland	September	50
13	MCCD Orientation training for Interns	Topiwala National Medical College & BYL Nair Hospital	October	41
14	MCCD Training of Interns and Training of Nurses for form 2	Face-to-face at SKMCH & HBCHRC, Muzaffarpur, Bihar	October	64
15	MCCD ToT for Nagpur division 6 districts	Face-to-face at PHI Nagpur	November	24
16	MCCD ToT for Thane division 3 districts	Face-to-face at HFWTC Thane	November	13

17	MCCD ToT for Pune division 3 districts	Face-to-face at HFWTC Pune	November	13
18	MCCD Orientation training for Interns	Topiwala National Medical College & BYL Nair Hospital	November	41
19	MCCD Training CME for doctors	Face-to-face at IMA Mumbai West	November	120
20	1st International Workshop for Strengthening Cause of Death Data Quality	Hybrid at Taj Lands End Mumbai	December	127
21	National Workshop for Strengthening Cause of Death Data Quality	Hybrid at MPMMCC Varanasi	December	123
22	MCCD Training CME for doctors	Face-to-face at IMA Mumbai, Haji Ali	December	82

Access to Affordable Cancer Care for One and All Project

Principal Investigator: Dr Pankaj Chaturvedi

Overview

To make cancer care accessible to people living in districts and bring down incidence of its preventable forms, Tata Memorial Centre (TMC) conceptualized project titled “Access to Affordable Cancer Care for One and All” in 2016

This project initially launched on a pilot basis in 6 districts of Maharashtra, now expanded in 34 districts of Maharashtra. In 2019 it has been scaled up at the national level.

The broad scope of activities conducted under project are state level awareness and sensitization workshops along with train the trainer programs, development of screening protocols and training modules for oral, breast and cervical cancer, an infrastructure and skill gap analysis study at District Hospitals, on-site district level training program on early detection of common cancers and 15-day hands-on training program for strengthening Preventive, Medical and in surgical oncology skills of health services staff.

Following is the data of training activities conducted under project during the period January 2022 to December 2022

Service

Project Activities status

Maharashtra:

Project is being launched and running in10 Districts (Jalna, Palghar, Raigad, Satara, Sindhudurg, Ratnagiri, Ahemednagar, Chandrapur, Bhandara, Wardha).

Sr No.	Project Activities	Data of FY 2022
1	Infrastructure and Skill Gap Analysis at District Hospital/Women Hospital	3 (Jalna, Raigad and Palghar)
2	On-site district level training: on “Early Detection, Screening and Prevention of Common cancers” No. of Medical Officers trained No. of Para-medical staff trained	2 229 200
3	In-house hands-on training No. of Districts covered No. of Doctors trained in Preventive Oncology No. of Nurses trained in Preventive Oncology	 12 24 24
4	Virtual training conducted on counselling for tobacco cessation No. of Virtual Training Conducted No. of doctors, counsellors and nurses trained in virtual training	 2 144
5	Virtual training conducted on "Early Detection, Screening and Prevention of Common cancers" No. of Virtual Training Conducted No. of doctors, counsellors and nurses trained in virtual training	 6 1800
6	No. of state level sensitization program conducted on cancer and tobacco No. of doctors trained in state level sensitization program	1 128

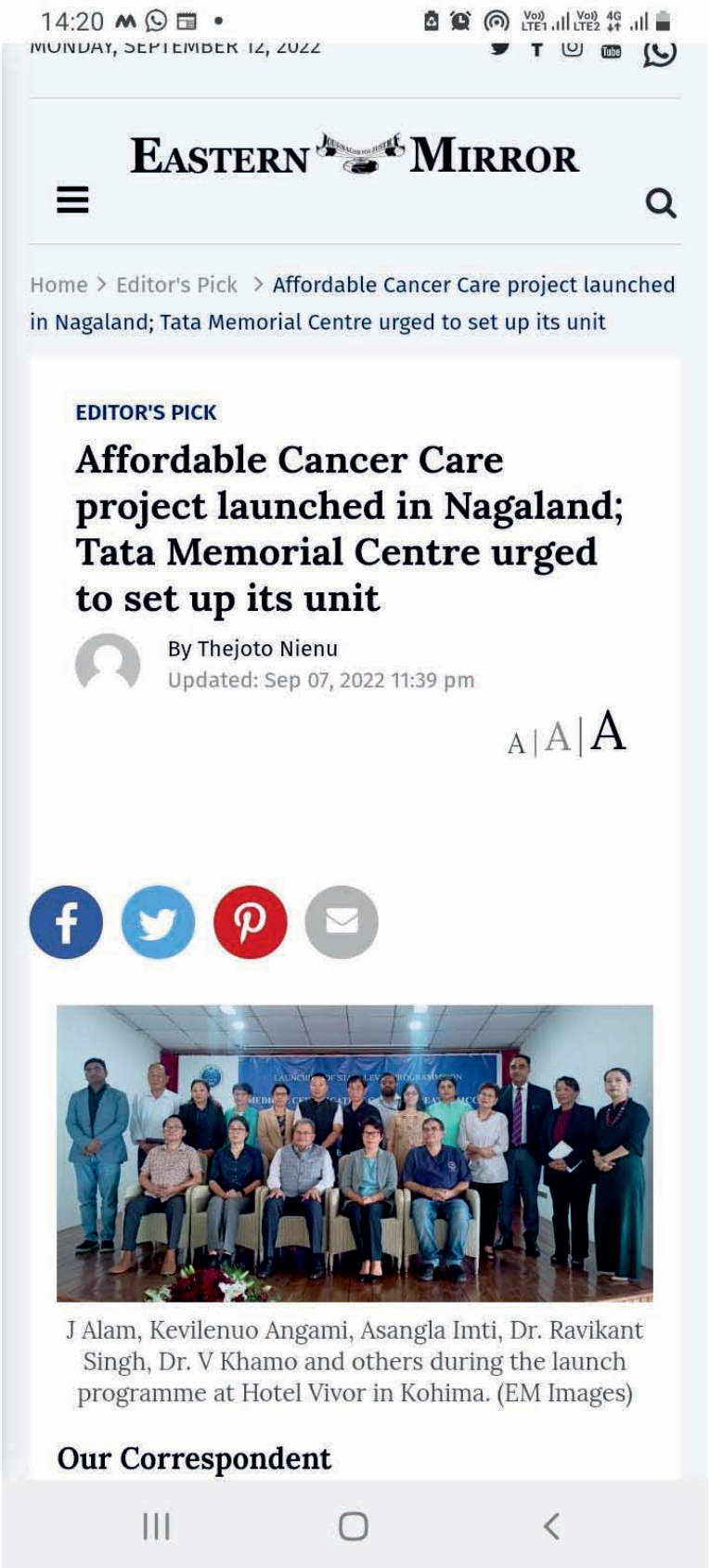
National Scale-up:

At National level this project is running in 6 states (12 districts) West Bengal (Darjeeling, Siliguri), Andhra Pradesh (Alluri Sitharama, Paderu, Anakapalle), Bihar (Buxar, Jehanabad, Gaya,

Bhagalpur, Purnia) Punjab (Amritsar, Sangrur) Nagaland (Kohima, Mokokchung), Odisha (Mayurbhanj).

Sr No.	Project Activities	Data of FY 2022
1	Infrastructure and Gap Analysis at District Hospital/Women Hospital	4 (West Bengal, Bihar, Nagaland, and Odisha)
2	On-site district level training No. of Medical Officers trained No. of Para-medical staff trained	3 (Kohima, Vizag, and Amritsar) 285 0
3	Virtual training conducted for tobacco cessation counselling No. of Virtual Training Conducted No. of doctors, counsellors and nurses trained in virtual training	 2 168

Gallery: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EDITOR'S PICK
Affordable Cancer Care project launched in Nagaland; Tata Memorial Centre urged to set up its unit
By Thejoto Nienu
Updated: Sep 07, 2022 11:39 pm
A | A | A
J Alam, Kevilenuo Angami, Asangla Imti, Dr. Ravikant Singh, Dr. V Khamo and others during the launch programme at Hotel Vivor in Kohima. (EM Images)
Our Correspondent



District Level Training Program at Palghar held on June 1st 2022



Administrative & Core Infrastructure Groups

Sr. Admin Officer		Mr. M. Y. Shaikh (Officiating Sr.AO 30.09.2021 still continuing)
HRD	Dy. Admin Officer (HRD) Jr. Admin Officer (HRD-OS)	Mrs. Shilpa Sardesai Mr. Devendra Pitale
Estate Management	Jr. Admin Officer (EM)	Mr. Shyam Anavkar
Accounts	Dy. Controller Accounts Dy. Accounts Officer	Mrs. Kamala Paidipati Mrs. Anuradha Narayanan
Purchase	Purchase Officer	Mr. Anandrao Kokare
Stores	Asst. Stores Officer	Mrs. Kanchana Gopalkrishnan
Engineering	OIC – Engineering Services	Mr. Hrishikesh Kelkar
Security	Dy. C.S.O (Gr.II)	Mr. Paul G. Pinto

Administration Department

Human Resource Development

Human Resource Development carries out the functions of manpower planning, performance management, recruitment of staff (regular as well as temporary), training and development of employees and also maintenance of discipline. One hundred thirty six regular staff members were appointed during the year 2022 in different grades in Medical, Scientific, Technical and Administrative cadres, abiding to the reservation policies of the Government of India.

25 Junior Research Fellows were selected for the Ph.D. degree under the HBNI. Various staff under Technical, Non-Technical & Nursing Category were appointed on Contract to distribute the work load increase due to inflow of cancer patients at the Centre. At present 208 Technical, 139 Non-Technical & 52 Nursing staff, 42 Security Guard, 20 Horticulture Staff, 172 House Keeping Staff, 94 Miscellaneous and 93 Supportive Staff are working under outsourced contractor at ACTREC. One hundred and fifty four staff on various projects have also been recruited for assisting in research work i.e. CRI – 79 & CRC – 75. Appointment of Twenty-Eight Fellowship Trainees for various courses at ACTREC: ATMLT – 04, Cytogenetics Trainees - 05, BMT Nursing Fellows - 02, Onco-therapeutics Fellows - 01, Biostatistics Trainees - 04, Molecular Hematology Trainees - 06 and Flow Cytometry Trainee - 06. The Department takes care of Career Planning through **merit based review and promotions of employees by holding yearly DPC** of all the employees. Day to day administrative functions encompassed e-attendance control, maintenance of leave records, updating of staff records with regard to pay fixation/ re-fixation matters, settlement of personal claims, release of retirement/ terminal benefits maturing on superannuation/ death cases, and payment in time of staff, time to time performance appraisal/ monthly attendance reports, proper follow-up of matters/ decisions taken during various meetings, diplomatic and amicable handling and settling of inquiry matters.

The Computer Programmer has developed & implemented the HRD software/programs viz., new applications to generate offer letter, new web application such as online APAR and Quarterly Assessment Report of probationers. Improvised the existing developed and

implemented software's/programs viz. FTS application to track file within same department, new LTC Special Package form and auto-generation of call letters etc.

• **APAR online web application** - Provides provision for Administration and Medical category to fill APAR online. Authorities (Reporting and Reviewing) do assessment of filled APAR online. Print APAR reports online

• **PIS web** - Migrate existing PIS Vb6 exe to Asp.Net with value addition features.

• **Employee portal** – As Bio-metric vendor is changed, TAS file generation and manual uploading of .TAS in Time keeper has been discontinued. Also TAS file logic from 'Todays Attendance' and 'Staff Attendance' pages has been discontinued.

• **Service Book Entry and Service Employee Portal** - Understand code received from TMH. Make changes as per the requirement by Administration and provide training and demonstration of application to Administration Team.

• **Pension form Application** - Understand code received from TMH. Make changes as per the requirement by Administration team and provide training and demonstartion of application to Administration Team.

• **GRN Inspection duty** - As per the requirement from Stores Department Notification Email (Approved Format) and SMS send in automation to staff as per duty list provided by Store Department.

• **Income Tax Slab option** - Understand code received from TMH. Make changes as per the requirement and implemented in employee portal.

• **Police Verification document pending Email notification** - reminder

• Provide data from System as per the requirement/Format received from Admin Authority Email notification to candidate as per the email draft and data received from Admin.

• APAR grade data upload as per data received from Administration Authority.

Timely payment of PRIS, update allowance to eligible employees, providing duplicate service Book to staff, service verification of staff those completed 18 years of service, are other activities carried by HRD. Implementation of the Reservation Policy of the Govt. of India duly

adopted by TMC in respect of SC/ ST/ OBC/ PWD/ Ex-Serviceman is carried out regularly and systematically, and all efforts have been made to ensure and achieve the prescribed percentage of reserved posts. In the report year, 2022; 7 staff members' attained superannuation and 1 staff member retired voluntarily.

Estate Management

The General Administration's Estate Management (EM) handles various services related activities of Tea-Coffee vending machine services, Pest Control Services, Photocopier Machines, Courier/ Post Services & Biogas Services. Most of the Annual Contract for the above facilities are also being looked after by Estate Management. Other ancillary services such as, billing of all above contract/Services. Refilling of gas cylinders in laboratories / BMT / Patient Hostels, Canteen are being taken care by Estate Management.

Providing Mobile handset and SIM cards as per the requirements and processing of the bills for the same. Maintaining and processing of Liveries and overtime details of permanent staffs.

Disposal of capital items / equipment, E- waste materials and local scrap materials are being taken care by Estate Management. The Centre takes pride in the large variety of flora on its campus through Horticulture Contract Carries out tendering process at the Retreat Cafeteria, Canteen Services and Hiring of Rallying Point Bus. A garden covering more than 100 species of trees shrubs and climber and lawns at different locations in the campus are well maintained by professionally trained horticulture and team of gardeners. Medicinal shrubs were planted in front of Bio Bank.

Public Relations Department

Since its inception, Public Relations Department has actively been engaged in organizing Employee engagement programs (Competitions, Superannuation program), arranging Patient-related programs, Observance of Days (as stated by DAE) and co-ordinating events like Inaugurations and Donor/VIP visits.

Since January 2022, some of the key events observed at ACTREC in the year 2022 are: Republic Day - 26th January; Observance of Silence Day - 30th January; Marathi Bhasha Mahotsav - February; International Women's Day-8th March; ACTREC Annual Day - 13th April; Birth

Anniversary of Prof. V.R. Khanolkar- 13th April; Inauguration of in-house Actrec Antarang Magazine- 12th May; Anti-Terrorist Day - 21st May; World No Tobacco Day Awareness Program (at Police Headquarters)- 31st May; World Blood Donor Day-14th June; International Day of Yoga- 21st June; Administrative Staff Training for ACTREC Staff, Students & Trainees -August-October; Independence Day - 15th August; Sadbhavana Divas -20th August; DAE's Iconic Week | 22nd August- 28th August; Hindi Pakhwada - 14th September – 26th September; Breast Cancer Awareness Program- 12th October; Observance of Rashtriya Ekta Divas-31st October; Observance of Vigilance Awareness Week- 31st October-6th November; Annual Prize Distribution-13th December; Bhartiya Bhasha Divas-11th December; Superannuation program (11 Employees); Inaugurations Raja S. Rao Shodhika (Day-care, Operation Theatre Complex, ICU complex & Post-Operative Recovery), Donor Equipment (Chemotherapy Units, Pulmonary Function Test Machine, Wheelchairs, Infusion Pumps, Cafeteria, Water Coolers). One of the key event organized by PR in co-ordination with other departments was DAE's Iconic Week under Azadi ka Amrit Mahotsav. Starting from 22nd August, a week-long celebration was held with various departments contributing to DAE's Iconic Week.

List of activities: Focused Group Discussion by National Tobacco Quitline Services, CCE for Security Staff, Drivers & Housekeeping Staff; Display of Motivational Quotes in Patient centric area; Talk on Infection Control by Sr. Deepthi (Nursing Services); Sapling plantation activity at Earthern Routes by Students, CRI; Talk: Ethics: Animal Research – Dr. P. R. Chaudhari, SO 'G', Animal Oncology Group (For Students and Trainees, CRI); Talk by Prof. Gagandeep Kang, Physician-Scientist, Christian Medical College, Vellore on "Vaccine Development in India", Blood Donation Camp for students at Pillai College of Engineering, Panvel; Awareness session on health hazards of tobacco, cancer prevention and early detection among rural population of Pend Village | Dr. Amey Oak, Medical Officer 'D' and OIC, Division of Hospital Based Cancer Registry and Patterns of Cancer Care, CCE, TMC along with team- Dr. Sivaranjini, Medical Officer 'D', Dr. Shalmali Chavan- Medical Officer, Mrs. Ashwini Patil- Scientific Assistant 'D' and Mr. Sumit Shirsath- Research Assistant; Awareness session on health hazards of tobacco at School & College; CPR Training Session for Non-Medical Staff by Br. Sooraj and Br. Anil (Nursing Services); Fire Safety Practices with situation learning & Practical Demonstration - Mr. P.G. Pinto, Dy. CSO Gr. II and Mr. Pravin Gunjal, Sub-officer 'A' (Fire); TMC Journal Watch Release

by Dr. R.A. Badwe, Director, TMC (Common activity for all TMC centres); Virtual talk on significance of Yoga – Dr. K. Amin, Consultant.

Public Relations Department has been instrumental in managing key events that hosted presence of Dignitaries like Dr. R.A. Badwe, Director, TMC, Dr. Sudeep Gupta, Director, ACTREC, Dr. R. Dikshit, Director, CCE, Dr. Navin Khattry, Dy. Director CRC, Dr. Pankaj Chaturvedi, Dy. Director, CCE, Dr. V. Prasanna Dy. Director, CRI. These key events were: Celebration of Republic Day | 26th January, 2022; Inauguration of 3D Printing Lab | 5th April, 2022; Visit of Parliamentary Standing Committee on Health and Family Welfare | 28th April, 2022; Observance of Science & Society Day | 6th May, 2022; Launch of Patients' Electronic Medical Records App | 1st July, 2022; Celebration of 75th Independence Day | 15th August, 2022 ; Inauguration of New Modular Operation Theatres, RRS | 23rd September, 2022; Observance of Vigilance Awareness Week Program (Chief Guest for the program: Shri. Jai Jeet Singh, IPS, Commissioner of Police, Thane) | 31st October, 2022; Visit of Delegates from Belgium Consulate | 7th November, 2022

Accounts Department

The main focus of the Finance and Accounts Department has been funds flow management by prudential and judicious budgetary controls and review of financial outflow. Maintenance of requisite documentation and other relevant records in conformity with the instructions issued by Department of Atomic Energy, Govt. of India was ensured. The Accounts Department is responsible for patient billing, receipting and settling of accounts of accounts of different categories of patient's i.e. smart card, cash paying, trust and company referred. The procurement of various supplies, materials and equipment's required for the centre was undertaken by following prescribed purchase procedure. The department is also responsible for proper utilization of Capital and Non-Plan grants, submission of various reports to DAE regarding utilization of funds and status of capital expenditure. During the year 2022, hospital and other income to the extent of Rs.70.80 crore has been generated.

In all, there were a total of 233 on-going projects at ACTREC during the year 2022. A sum of Rs. 5.46 crore was received from Government agencies such as DBT, DST and ICMR etc. to meet the expenditure of their on-going projects. In addition, 13 new extramurally funded projects to

the tune of Rs. 4.28 crore for an average three years' periods were sanctioned by the above mentioned funding agencies, of which Rs. 1.37 crore were received during the calendar year.

Purchase Department

Purchase department aims to provide efficient services to the entire Centre by way of arranging and delivering goods as per the approved quality and quantity within minimal supply time. All the procurement viz. indenting, comparative statements, appropriate approvals, generation of purchase orders, reminders etc. is done with the help of Material Management System (MMS), which is in-house software developed by our Information Technology (IT) Department. Implementation of MMS assisted in efficient functioning of procurement activities and obtaining the materials with ease. During the report year, Purchase Department floated 288 E-Tenders through CPP Portal to maintain more transparency in the procurement system and response from the vendors was satisfactory. This is also important and requisite protocols as per DAE and CVC norms. As per Rule 149 of GFR 2017, 288 purchase orders are being processed through GeM (Government e-Marketplace).

During January 2022–December 2022 procurement of the equipment(s) worth value of Rs.29.19 crores, consumables worth Rs.18.98 crores and contracts for the supply of Spares / Work Orders worth Rs.44.55 crores and AMC worth Rs.5.35 crores have been procured/lined up by the Department.

Stores Department

The function of the Main Stores, is to stock and support the day to day requirement of various wards / Out Patients units /CRI / CRC / CCE/ Hostel facilities and departments as and when required. The Stores receives all stock and non-stock consumables, spares and capital equipment except drugs and surgical goods.

The Stores department handles routine receipt of stock, non-stock and capital Indents. The material is issued after receipt of goods, generation of GRIN (Goods Receiving and Inspection Note) and Inspection. Asset Records are maintained systematically. Annual and Half Yearly

Stock verification are conducted and we provide support for asset verification and audits.In the Year 2022-2023: Total number of PSN generated were 9750 (Purchase Sanction Note) and the total number of GRIN generated were 10985. All the work of Stores department is digital (Paperless) like receiving of Indents, generating PSNs through system and forwarding the same to Purchase department. Purchase Order copies are received in system. Materials are received through GeM procurement and we follow the GeM protocol for receipt of goods. The member of the inspection committee after satisfactory physical verification of materials, confirms GRIN inspection through system. Store Officer approves the GRIN online. Delivery note and confirmation of receipt of material are done through online procedure.

Asset Cell carries out all the activities pertaining to assets, and updating records of all the assets located in the organization. The cell looks after the ASSET MANAGEMENT SYSTEM which includes physical and virtual transfer of the assets from one satellite unit to another unit and also within the organization. The total number of Assets in 2022-2023 were 7030 in number. The achievement of 2022- 2023: all departments can view the following asset details in the Material Management System; List of Active Assets, List of Scrapped Assets and the List of Transfer Assets (in house / satellite units)

Engineering Services

Engineering Services one of the most promising department of the institution is committed to provide round the clock support and optimization in the use of facilities pertaining to patient care, research and educational activities of the Centre and to make the everyday experiences of our patients, doctors, research scholars and staff better. To ensure all this, the Department truly believes in hard work, perseverance, teamwork, ability to communicate effectively and attitude for delivering timely results, as its strong pillars. Since past few years the domain of work is no longer limited to operation and maintenance of various critical engineering systems, campus maintenance-namely, buildings, roads, water and sewer lines and other electrical & mechanical allied services but also in liasoning work with local government authorities for obtaining various NOCs and permissions, for ongoing projects like construction of Shantilal Shanghvi Paediatric Haematolymhpoid Cancer Centre, completed ones like STP including laying of campus wide sewer lines, WTP, ETP for CRI, 21 lakhs litres Underground water storage tank, Modular OT and ICU Facilities in newly constructed Raja S Rao Shodhika, newly renovated OPD

Block in Shanti Sadan and out of campus works like Ayurvedic Cancer Hospital & Research Centre at Tambati, Medicinal Plant Cultivation Facility & Skill Development Block at Donvat and Preventive Oncology Services at Khopoli and many more projects. Preliminary work for construction of a hostel building inside campus for accommodating staff nurses, resident doctors and a multi-level car parking facility is also underway. Major general infrastructure and repair projects as sanctioned by Department of Atomic Energy have also been executed. Fortunately the Departments has the support of 130 credible and outperforming permanent and contractual taskforce in capacities of Engineers, Jr. Engineers, Supervisors, technicians, plumbers, carpenters, electricians, AC operators, AC technicians, pump operators and auxiliary staffs who with tireless efforts solve day-to- day problems smoothly. This work-force enables the Department to be ever-ready and confident to execute duties assigned by the Management regularly. The routine engineering work briefly includes the following: operation & maintenance of air-conditioning system with chilling plants, cooling towers, package units, water coolers, refrigerators, deep freezers, medical oxygen system, LPG distribution network, all mechanical and fabrication works; in house repair and maintenance of close to 500 window/split air conditioners; 33KV high tension switch gears, transformers, LT panels, lighting and power distribution, DG sets, cabling, lifts, communication and PA systems and patient calling system; maintenance of water supply, fire hydrant, sanitary and drainage systems; civil work including all alterations, additions, masonry, plumbing, painting, carpentry, maintenance and revamping of buildings, road and compound wall of 60 acres campus; coordination with architects, planners for construction of new buildings in campus; distribution of liquid nitrogen on a regular basis to research laboratories; maintenance of laboratory equipment, furniture and various hospital utilities; planning and implementing the up gradation and replacement of facilities, carrying out preventive, corrective and deferred maintenance of buildings, making of short term and long term recommendations for financial allocation and budgeting, providing project management services as per requirement and catering to the signage / nameplates requirements for the entire campus.

Security Section

Strict Access Control & regulation of Men, Material and Vehicles on the Campus is maintained to ensure the Safety and Security of ACTREC Property, Personnel, Students & Patients, round

the clock is the prime responsibility of this Section. To further strengthen the Security Force M/s Maharashtra Security Force Security Officials are deployed, to enhance the building & peripheral Security measures at ACTREC. Imparting on the job training to the Security Staff has been a periodically exercise, so as to refresh the Security measures/aspects to combat with unforeseen situations/ threat perceptions. Improvised Surveillance System has been inducted in the prevailing Security system, which covers the Building/Facilities, vital areas and Main Gate, to prevent unauthorized access & to detect objectionable activities in the campus. Work of improvised Fire alarm & detection system has been completed and work of firefighting system to tackle any kind of fire exigencies has been completed. The Prime Motto is to have a fear free atmosphere at ACTREC Campus. Security Audits of ACTREC is periodically carried out by the Subsidiary Intelligence Bureau, National Security Guard, State Intelligence Bureau and Maharashtra State Police Force-1. Certain additional Security measures recommended by the above agencies are inducted in the prevailing Security system to further strengthen the Security measures. A training workshop for enhancing communication skills of security staff was conducted on 9th April 2022; the training workshop was organized and supported by Dr. Reddy's Laboratories. Ms. Urjita Deshpande, Clinical Psychologist and behavioral soft skill trainer was invited as a guest of honour and as a trainer for the Training Workshop.

The 08 in Nos. officials from Special Commando's Maharashtra Police Force –One, headed by Mr. Keshav Rathod, Assistant Police Inspector carried out the Reconnaissance of ACTREC premises on 24/11/2022.Ceremonial parade was performed on the eve of Republic Day and Independence Day by the Security Staff of ACTREC. Proper liaison is maintained with the local Police, RTO, CIDCO, Municipal authorities, and other outside agencies. Security Section also efficiently manages the Centre's Departmental Transport activities, viz. efficient running of the shuttle bus services, Doctor's run Vehicle, Patient related transport facilities, condemnation of old vehicles, obtaining RTO permits / licenses for newly procured vehicles. **Vigilance Awareness Week** was observed as per the directives and Guidelines issued by Central Vigilance Commission, Govt. of India from 31st October to 6th November 2022. Mr. Jai Jeet Singh, IPS, Commissioner of Police, Thane, was the Chief Guest at the function organized on the first day of vigilance week at Khanolkar Shodhika, Main Auditorium. Who

shared his Views/thoughts on **"Corruption Free India for a Developed Nation (विकसित राष्ट्रासाठी भ्रष्टाचार मुक्त भारत)".** The Program was attended by the following dignitaries Dr. Sudeep Gupta, Director, ACTREC, Dr. Rajesh Dikshit, Director, CCE, Dr. Navin Khattry, Dy. Director, CRC-ACTREC , Dr. Venkatraman Prasanna , Dy. Director, CRI-ACTREC , Dr. J. P. Agarwal, Chief Vigilance Officer, TMC, Dr. Tejpal Gupta, Nodal Officer for Vigilance, ACTREC, Mr. Johnson Lukose, Chief Security Officer, TMC and Sr. Administrative Officer, ACTREC. Dr. J.P. Agarwal, Chief Vigilance Officer, TMC, Dr. Tejpal Gupta, Nodal Officer for Vigilance, ACTREC administered the pledge in Hindi and English followed by the Staff/Students approx. 150 Nos. who pledge to ''**Corruption Free India for a developed Nation''**.



Information Technology (IT)

IT Coordinator: Mr. Prasad Kanvinde

Officers: Mr. Padmakar Nagle
Mr. M. Sriram
Mr. Anand Jadhav

In fulfillment of its mandate, the Information Technology (IT) Department provides computational facility, infrastructure and support for information access, processing, printing, archiving, dissemination, etc. ACTREC has a campus wide 1 Gbps LAN with copper/ fiber cable, embellished with ~1000 LAN nodes, eight servers and is equipped with secured wi-fi network. The campus is connected to the Internet through a 1Gbps shared NKN information gateway with redundant 155Mbps Tata teleservices connectivity. A summation of the activities of IT department during 2022 is provided below.

Networking: Day-to-day support, upkeep, administration and maintenance of passive and active network components constitute vital networking activities. Support to the exponentially increased online meetings, conferences, webinars etc. was continued as the major task associated with the department in this year. The department has also established encrypted and most secured connectivity to its campus resources from the remote places with a data leakage prevention feature. The Department has established high speed Local area Network for New RRS (HWCC) building and RRU buildings for almost 350 points for each building. The department is now in the process of Implementing Wi-Fi network in RRS building.

Hardware: The Department has received the delivery for major equipment like HCI server, wireless networking, Networking active components for RRU building, Desktop PCs, matching number of printers, Laptops, various peripheral device, audio visual equipment and has completed the installation with successful commissioning. The Department also supported major projects like HPC. The department is about to raise tender for IBM I series Power 10 server.

Software: Patient information processing at the centre is essentially online, multi-location and round-the-clock. In 2022, the Department has taken a major task of increasing patient case number from 8 digit to 14-digit length. Customization in the same context & updates for various modalities like PABR, DIS, RIS, ROIS, OT, Accounts, Pharmacy, store & Purchase were made available. Department has developed an Android based EMR application for the patients and a 'Foodizone' application for online placing orders for canteen services. Web based online portal for Referral patients is also ready for the deployment. Software subscriptions for Microsoft office, antivirus software and VMWARE /ARCSERVE backup software were also procured/renewed.

Library

Librarian: Dr. Satish Munnolli

The Institute's learning resource center the ACTREC Library, is actively involved in gathering, compiling, and disseminating scientific and clinical information to its scientific fraternity and users. In order to support the institute's research, patient treatment, and continuous educational programs, the library offers its facilities of providing articles and access to the scientific literature on various platforms and on library's homepage. To meet the user's regular requirements, the Library subscribed to 72 scientific journals in the field of cancer research/oncology and allied areas in the year 2022. The Library has a collection of 5914 books, 12595 bound journal volumes, 665 theses, 3789 staff publications, 434 reports, and 20 videos. Through NCG-TMC, two online clinical tools, ClinicalKey and UpToDate, and a discovery tool 'Akshara' have been activated. These provide access to data on clinical trials, drug monographs, recommendations, patient education resources, multimedia, and many more. In the same NCG program, another 27 clinical journals have been activated on the OvidSP search platform.

To enhance the research outcome of the Centre, subscriptions have been made to two online tools: 'Grammarly', a tool that supports in science communications, and 'RemotLog', an application that facilitates users to access subscribed full-text contents remotely. A weekly newsletter – 'Science Sparks @ ACTREC', from the Library continues to highlight staff publications of the week and upcoming major scientific events. The scientists and clinicians community use the library's article request service and plagiarism report support services regularly for their research and academic endeavors. The Library provides articles to both individual visitors and other DAE units through interlibrary loan lending facility. During the year, the Library has provided institute's publication details to the management viz., DAE/TMC/TMH/ACTREC and various departments in the Centre as a requirement and project proposal submissions. Citations of publications, h-index, Impact Factor, journal quartile legitimacy, open access models, article processing fees, bibliographic services, reference, and referral services are offered both in anticipation and on demand.

The Library chooses the most appropriate and cost-effective models while subscribing online resources and acquiring information needs. Information literacy programs were regularly

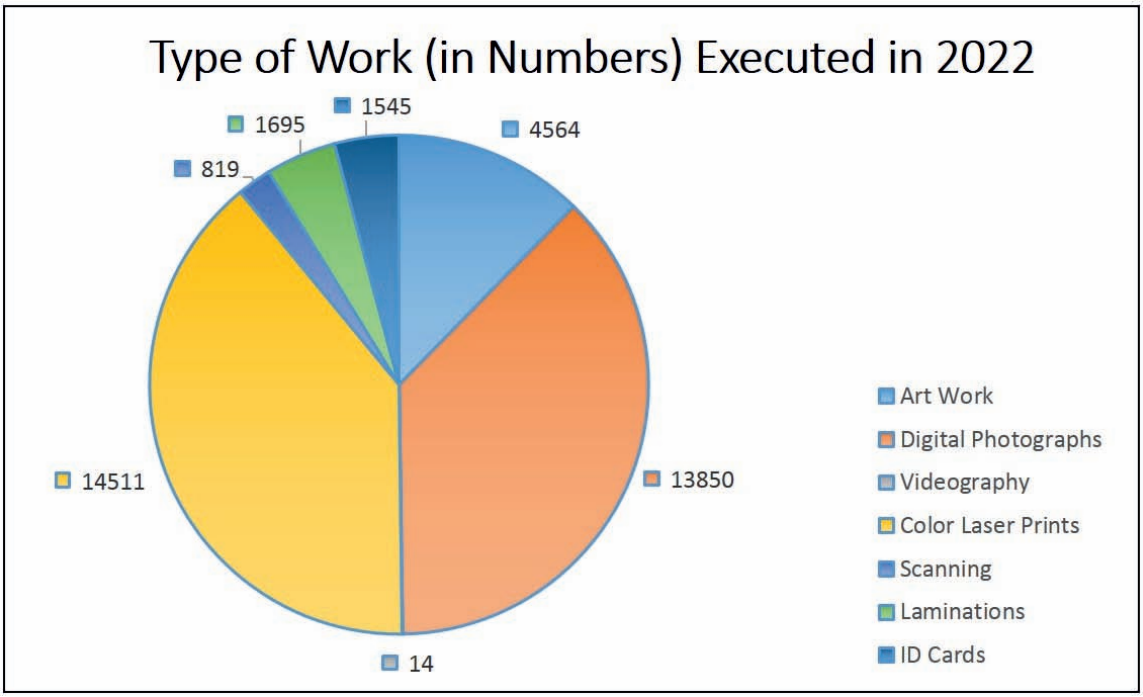
organized by the Library to new students. Together with user training for new students, one-on-one tutorials on literature search methods and procedures for locating reliable information sources are organized. The Library has organized lectures to help researchers understand research metrics, Impact Factor, h-Index, bibliography management tools, and plagiarism tools. These services, which largely focus on the utilization of online tools and resources, were beneficial to young researchers. The library personnel actively participated in a number of online national and international library science conferences. The library organized an online workshop on 'Improving academic writing with Grammarly'. Librarian, as a resource person actively participated and contributed in the 4th LISACON2022 conference, organized by the LIS Academy, Bengaluru and edited the conference volume. The library staff has participated in a training program conducted by INFLIBNET to enhance the service features of 'ACTREC IRINS instance' - a research profile platform of the Institute and Faculty.

Photography

Officer-in-Charge: Dr. Satish Munnolli

In-charge: Mr. Shyam Chavan

Photography section of ACTREC provides support to the scientific / medical staff and students towards photo-recording of their experimental studies and research results in pictorial formats. The state-of-the-art facility has high end digital cameras to record the images and to get visual clues to research experiments, using the advanced desktop publishing software. The section handles designing, printing and display of announcement brochures/flyers, banners, programs, letterheads, invitation cards, signage's, nameplates, coupons, badges, certificates, posters, workshop protocols / abstract books and various other print and digital formats for the scientific meetings viz., conferences, workshops as well as Cultural Program events organized at ACTREC. The section also assists in the preparation of poster/slide presentations for scientific user's community and handles printing of identity cards for security and administrative services. The section takes photographs of the campus, functional groups, and infrastructure of the Centre, carefully archives all the images, and provides them for use in the Centre's print publications, presentations, website and management to administrative and presentation purposes. This Section takes videos of surgical, institutional and departmental events and programs. This Section also assists users in handling the presentation equipment in the seminar / conference / meeting / board rooms and mini auditorium. During 2022, the Facility provided photographic support for 90 events held at ACTREC (national and international events, workshops, conferences & other programs) including Artwork for CRI, CRC, CCE departments.


Type of Work (in Numbers) Executed in 2022
1545
1695
4564
819
14511
13850
14
Art Work
Digital Photographs
Videography
Color Laser Prints
Scanning
Laminations
ID Cards



Science Communication and Professional Education (SCoPE) Cell

Officer-in-Charge: Dr. Satish Munnolli

In-Charge (Project Cell): Dr. Ojaswini Upasani

The **Science Communication and Professional Education Cell** plays a crucial role in ensuring smooth functioning of all academic programs and scientific events of the Centre in coordination with Principal Investigators and Officers- In-Charge of various facilities.

Science Communication

On the occasion of the 75th Indian Independence Day celebrations, "Azadi Ka Amrut Mahotsav", the SCOPE Cell organized and coordinated a series of science outreach programs. A guest lecture by the clinician and eminent scientist, Prof. Gagandeep Kang on 'Vaccine Development in India' and a special science outreach program in which over 70 students from different science colleges visited the Centre to witness research experiments at the Centre, were the highlights of the event. Essay writing, painting, elocution and quiz competitions for college students were organized in the month of August. The Cell coordinated for the Tobacco awareness program at Sharon High School, Nere Village and CKT College, New Panvel highlighting the health risks of tobacco use. The ACTREC Open Day in December 2022 received a great response with a footfall of over 500 students and 37 faculty members from 32 colleges. To ease the Meeting Room reservations, an online application for booking venues was developed in coordination with the IT Department.

Professional Education

The Centre's doctoral program is its prime academic endeavor. In support of the Centre's research projects, the Cell efficiently handled the absorption of JRF 2022 students under various doctoral programs. To augment the intake of new students, in collaboration with Tata Consultancy Services (TCS), an online entrance exam was conducted at 10 major cities for shortlisting the students. The cell has coordinated with Academic Committee to finalize the JRF advertisement, call for projects, and pre-screening of applications. Overall from the received 1928 applications, 1806 candidates appeared for the online exam. The applications were filtered as per the set criteria and 280 candidates were interviewed by two committees in

virtual mode using 'Zoom', and finally, 25 students were absorbed for different research projects.

The SCOPE Cell ensured smooth completion of the academic coursework of the 2022 batch which involved: scheduling orientation of different departments; Laboratory visits; PI Laboratory choices; timely conduct of the core course/ elective lectures, exams and seeking elective choices; Doctoral Committee formation, seminar presentations, correcting papers, collating and preparing final marks/transcripts. With the input of the Academic Committee, the SCOPE Cell organized Friday Seminars for students. To support Centre's training programs, the SCOPE Cell handled the Trainee intake procedures of CRI, CRC and CCE with provision of all the administrative support for the smooth completion of academic programs of various college and university students. In the year 2022, 285 Trainees (54 observers, 17 summer trainees, 88 dissertation trainees, 117 experience interns, 2 as research associates and 2 as visiting scientists, 5 collaborative and PDFs) were allocated to senior and mid-level faculty/clinicians/staff of the Centre. During 2022, the Cell coordinated the logistics of four educational visits of students from Humera Khan College of Pharmacy, Mumbai; M.S. University, Vadodara; Bharati Vidyapeeth and D.Y. Patil Colleges situated in Navi Mumbai.

Scientific Resources

Core Committees in ACTREC

ACTREC Apex Committee for Research and Academics (AACRA)

AACRA, which was established in April 2006, acts as the apex research and academics committee: to carry out the mandate given to ACTREC by the Scientific Advisory Committee, promote basic, interdisciplinary, translational and disease oriented research, recommend and coordinate measures for achieving excellence in research and academics.

Chairperson	Dr. Sudeep Gupta, Director, ACTREC
Member Secretary	Dr. Prasanna Venkatraman, Dy. Director, CRI-ACTREC
Members	Dr. Navin Khattry, Dy. Director, CRC-ACTREC
	Dr. Rajiv Sarin, SO 'H', PI Sarin Lab

Basic Sciences Research Group (BSRG)

BSRG is a forum of basic scientists at ACTREC where scientific issues related to academic and research programs, infrastructure development, organization of symposia and meetings, updates on research support facilities, opportunities for extramural and intramural funding support and related matters are discussed.

Chairperson	Dr. Sudeep Gupta, Director, ACTREC
Co-Chairperson	Dr. Navin Khattry, Deputy Director, CRC-ACTREC
Co-Chairperson	Dr. Prasanna Venkatraman, Deputyy Director, CRI – ACTREC
Member Secretary	Dr. Rohan Khadilkar, SO 'D'
Members	All Principal Investigators & Co-Investigators
	In-Charges of Facilities in CRI

Institutional Animal Ethics Committee (IAEC)

IAEC reviews the maintenance of the ACTREC laboratory animal facility as well as animal study proposals, and also advises the investigators to ensure optimal use of the animals as per the guidelines laid down by the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Ministry of Environment, Forests and Climate Change, Govt. of India. As per guidelines, both CPCSEA registration and IAEC is to be renewed and

reconstituted every three years, and accordingly the IAEC of ACTREC has been reconstituted in 2015. The Laboratory Animal Facility of ACTREC itself is registered with the CPCSEA for breeding and conducting experiments on small laboratory animals, vide registration no. 65/GO/ReBi/S/1999/CPCSEA.

Chairperson	Dr. Sanjay Gupta, Scientific Officer 'G', ACTREC
Member Secretary	Dr. Arvind Ingle, In charge of Animal House Facility
Members	Dr. Sanjeev Waghmare, Scientific Officer 'F' ACTREC
	Dr. Shilpee Dutt, Scientific Officer 'F' ACTREC
	Dr. Rahul Thorat, Veterinarian, ACTREC
	Mr. Sharad Bhagat, Main Nominee (CPCSEA)
	Dr. Swapnil Bangar, Link Nominee (CPCSEA)
	Mr. Sameer Shaikh, Scientist from Outside the Institute
	Prof. Vishnu Thakare, Socially Aware Nominee

Institutional Biosafety Committee (IBSC)

IBSC serves as the nodal point for implementation of the biosafety guidelines for recombinant DNA research, their production and release into the environment, and setting up containment conditions for certain experiments as set by the Recombinant DNA Advisory Committee of DBT. Research projects involving the use or production of microorganisms or biologically active molecules that might cause a biohazard must be notified to the IBSC in the DBT-prescribed format. The IBSC permits genetic engineering activity on classified organisms only at places where such work should be performed. The committee members are empowered to subject the storage facility, work place, etc. to inspection.

Chairperson	Dr. Sanjay Gupta, Scientific Officer 'G', ACTREC
Member Secretary	Dr. Shilpee Dutt, Scientific Officer 'F', ACTREC
DBT Nominee	Dr. Badri Narain Pandey, Scientific Officer 'H' and Head, BARC, Mumbai
Members	Dr. Abhijit De, Scientific Officer 'G', ACTREC- Internal Expert
	Dr. Sejal Patwardhan, Scientific Officer 'D', ACTREC- Internal Expert
	Dr.Bhavani Shankar, BARC,Trombay- Outside Expert
	Dr. Shashank Ojha, CRC, ACTREC -Biosafety Officer

Institutional Radiation Safety Committee (IRSC)

IRSC is mandated to ensure that the guidelines of the Atomic Energy Regulatory Board for the use, storage, handling and disposal of radioactivity are followed in the respective areas by the designated officers, along with guidelines defined by IRSC. At ACTREC, radioactive sources are used for in-vitro assays, radiation treatment and radiodiagnosis procedures in clinical and preclinical setup. IRSC monitors the safe handling, use and disposal of radioactive sources, and occupation safety aspects while working in the radiation areas. The duration of this committee is up to March-2025.

Chairperson	Dr. Navin Khattry, Dy. Director CRC-ACTREC
Member Secretary	Dr. Pradip Chaudhari, Scientific Officer 'G', CRI, ACTREC
Members	Dr. Vedang Murthy, Radiation Oncologist 'G', ACTREC

Dr. Shashank Ojha, Prof. Dept. Of Transfusion Medicine,ACTREC

Dr. Amit Kumar Janu, Assoc. Prof. Radio Diagnosis, ACTREC

Dr. Sayak Choudhary, Assist. Prof. Nuclear Medicine, ACTREC

Ms. Reena Devi, CRC, Medical Physicist 'E', CRC,ACTREC

Mr. Lalit Chaudhari , Medical Physicist 'E', CRC,ACTREC

Sr. Administrative Officer, ACTREC

Ms. Anjali Rawat, Assistant Nursing Superintendent, ACTREC

Mr. P G Pinto, Dy.CSO, Grade I, ACTREC

Academic Committee

The Academic Committee oversees all matters pertaining to the JRF program and coordinates the academic coursework (core course and electives), JRF entrance exam paper setting, and ensures the smooth conduct of the course exams.

Chairperson	Dr. Abhijit De, Scientific Officer 'G', ACTREC
Member Secretary	Dr. Rukmini Govekar, Scientific Officer 'G', ACTREC
Members	Dr. Kakoli Bose, Scientific Officer 'G', ACTREC
	Dr. Sanjeev Waghmare, Scientific Officer 'F', ACTREC

Dr.Shilpee Dutt, Scientific Officer 'F', ACTREC

Dr. Syed Hasan, Scientific Officer 'F', ACTREC

Dr. Rohan Khadilkar, Scientific Officer 'D', ACTREC,

Internal Complaints Committee (ICC)

In pursuance of section 4 read with its applicable sub-clauses of the aforesaid act, the Internal Complaints Committee (ICC) at TMC-ACTREC is empowered to enquire into the complaints related to the sexual harassment of women at the workplace. The duration of this committee is up to March-2025.

Chairperson	Dr. Preeti Chavan, Manager-Diagnostics, Scientific Officer 'F' ACTREC
Member Secretary	Dr. Vikram Gota, Clinical Pharmacology, Scientific Officer 'G', ACTREC
Members	Dr. Rukmini Govekar, Scientific Officer 'G', ACTREC
	Dr. Prafulla Parikh, Prof., General Medicine F, ACTREC
	Mrs. Bhagyashree Tillu, Medical Social Worker, ACTREC
Convener	Mr. Devendra Pitale Jr. Administrative Officer, ACTREC
Outside expert	Dr. Nasreen Rustomfram, Prof. & Chairperson, Centre for Life Long Learning, Tata Institute of Social Sciences, Mumbai.

Anti-Ragging Committee

In May 2014, an Anti-Ragging Committee was constituted at ACTREC in terms of the decision taken by the Government of India, duly notified through the Homi Bhabha National Institute (HBNI) under whose affiliation the Centre conducts its Ph.D. program in Life Sciences. This committee looks into the matter of complaints of ragging at ACTREC. The duration of this committee is from April-2022 to March-2025.

Chairperson	Dr. Prasanna Venkatraman Dy. Director, CRI, ACTREC
Members	Dr. Vikram Gota, Clinical Pharmacology, Scientific Officer 'G', ACTREC
Member-Secretary	Dr. Shilpee Dutt, Scientific Officer 'F', ACTREC
	Dr. Ujjwala M. Warawdekar, Scientific Officer 'G', ACTREC
	Dr. Syed Hasan, Scientific Officer 'E', ACTREC
Student Members	Mr. Archisman Banerji, Shilpee Lab, ACTREC
	Ms. Neha Agarwal, Rukmini Lab, ACTREC

Grievance Committee

Grievance Committee has been constituted to redress the grievances of all regular staff as well as of temporary staff, registrars and students working at ACTREC, TMC. The duration of this committee is from April-2022 to March-2025.

Chairperson	Dr. Arvind Ingle, Scientific Officer 'H'
Member Secretary	Dr. Preeti Chavan, Lab Manager-DS, SO'F'
Member	Dr. Sanjay Gupta, Scientific Officer 'G'
Member	Dr. Sorab Dalal, Scientific Officer 'H'
Member	Dr. Amit Joshi, Medical Oncologist 'G'
Member	Senior Administrative Officer
TMHWU Rep	Mr. J. K. Rane, Technician 'H'
Student Members	Ms. Neelima Yadav
	Mr. Archisman Banerji, Shilpee Lab, ACTREC

Students' Council of ACTREC (SCA)

In July 2013, the Centre constituted SCA for the PhD research scholars of ACTREC enrolled under HBNI. SCA organizes various student welfare and recreation (academic, sports and cultural) activities, and also acts as a 'liaison' between students and ACTREC faculty/ management for academic and non-academic issues - including grievances. The core committee consists of five members with no hierarchy. The committee includes one student from each batch up to the 5th year, which includes at least one hostel resident and one female candidate. Core committee members are selected on the basis of nominations from each batch and membership is for one year. SCA meetings are held twice a month and whenever needed.

Members

Ms. Shivali Mishra (De Laboratory)

Mr. Archisman Banerjee (Shilpee Laboratory)

Ms. Neha Agrawal (Rukmini Laboratory)

Mr. Aiyas Mujawar (De Laboratory)

Mr. Rudransh Singh (Dutt Laboratory)

Institutional Ethics Committee III

TMC IEC – III (ACTREC)

Member Secretary: Dr. Sudhir Nair

The TMC-ACTREC Institutional Ethics Committee (IEC-III) was established in December 2009 as per the ICMR and ICH- GCP guidelines for Ethics Committees, at ACTREC, TMC. The IEC-III, constituted by the Director, TMC under the authority vested upon him by the Governing Council of TMC, monitors projects carried out at ACTREC, TMC. The present committee is constituted for the term - 01st April 2022 to 31st March 2024. The committee has met 133 times in the past 13 years and 741 projects have been discussed till December 2022. The entire spectrum of studies involving human subjects including epidemiological studies, biological studies on human tissues, retrospective audits, pharmacokinetic studies and human clinical trials using drugs or additional invasive intervention had been discussed and approved by the Committee.

The details of the members of IEC-III are as follows:

Sr. No.	Name & Position	Affiliation	Affiliation Status	Gender	Expertise
1.	Dr. Surekha Zingde, Chairperson	Trustee, Indian Women Scientists' Association, (IWSA), Former Deputy Director, CRI, Scientific Officer 'H'	Non Affiliated	Female	Basic Scientis
2.	Dr Shona Nag, Member	Director, Oncology, Sahyadri Super Speciality Hospitals, Hadapsar, Survey No. 163, Bhosale Nagar, Pune, 400 028, Maharashtra	Non Affiliated	Female	Clinician (Medical Oncology)
3.	Dr. Pravesh Golay Member	Associate Professor, Department of Humanities and Social Sciences, Indian Institute of Technology Bombay, Powai, Mumbai - 400 076, India	Non Affiliated	Male	Philosopher
4.	Dr Sudhir Nair, Member Secretary	Prof. Head and Neck Surgical Oncology, ACTREC., TMC	Affiliated	Male	Clinician (Surgical oncology)
5.	Dr. Sangita Sukumaran, Member	Prof and Head, Department of Pharmacology, Terna Medical College Navi Mumbai, 400706	Non Affiliated	Female	Clinical Pharmacologist

					(Basic Medical Scientist)
6.	Mrs. Deepa Ramani, Member	Zenith Spinners Ltd. Ex-play group teacher, store and purchase in-charge, Zenith Spinners Ltd., Member of IC-SCR, ACTREC	Non Affiliated	Female	Layperson
7.	Mr Akil Hirani, Member	Head of the Transactions Practice and Managing Partner Majmudar & Partners, International Lawyers, India	Non Affiliated	Male	Legal Expert
8.	Dr. Girish Maru, Member	Former Principal Investigator and Scientific Officer 'H', CRI	Non Affiliated	Male	Basic Scientist
9.	Dr. Syed Hasan, Member	Principal Investigator and Scientific Officer 'E' ACTREC, TMC	Affiliated	Male	Basic Scientist
10.	Dr Naveen Mummudi, Member	Associate Professor, Dept. of Radiation Oncology, Tata Memorial Hospital, TMC.	Affiliated	Male	Clinician (Radiation Oncology)
11.	Dr. Sachin Punatar, Member and DSMU Secretary	Prof. Medical Oncology, E (Adult Hematolymphoid) ACTREC, TMC	Affiliated	Male	Clinician (Medical Oncology)
12.	Dr. Shalaka Joshi, Member	Prof. Dept. of Surgery, Tata Memorial Hospital, TMC.	Affiliated	Female	Clinician (Surgical oncology)
13.	Dr. Prashant Tembhare, Member	Clinician Scientist and Prof in Hematopathology Laboratory (SO F) ACTREC, TMC	Affiliated	Male	Basic Medical Scientist (Hemato Pathology)
14.	Dr. Nitin S Shetty, Member	Prof. Interventional Radiology, Tata Memorial Hospital, TMC	Affiliated	Male	Clinician (Intervention Radiology)

Other Staff members

Sr No	Name	Qualification	Job responsibilities
1	Ms. Kasturi Awatagiri	M.Sc.	Clinical Trial Co-ordinator
2	Ms. Sajiri Tengashe	M. Pharm.	IEC Co-ordinator
3	Mr. Umer Ahmed Khan	M.Sc.	IEC Admin Assistant
4	Ms. Vaibhavi Patil (joined in November 2022)	M.Sc.	DSMU Co-ordinator
5	Mr. Nitin Mhatre	10th	Office Attendant

Regulatory Registration:

- IEC is registered with CDSCO (Registration No. ECR/149/Inst/MH/2013/RR-19) on 09.12.2020 and it is valid up to 20th April 2024.
- DHR: IEC registered with DHR on 31.08.2022 and validity is given for 5 years (30.08.2027)
- IEC III is also register with HHS and IORG No. IORG008037.
- OHRP: Renewal of Office for Human Research Protection (OHRP) has been done on 05.12.2022 and valid up to 30.06.2025
- Institution had a Federal Wide Assurance with Dept. of Health and Human Services (DHHS) through the Office for Human Research Protection (OHRP). The assurance no is FWA00025032. Valid up to 16.12.2026.

IEC-III PERFORMANCE 2022

The committee conducted 12 full board committee meetings in 2022 for meticulous scrupulous examination of the scientific and ethical contents of submitted projects, owing to which 62 new projects and 44 old projects from 2020-2021 were examined.

Table 1: Review type

Review type	2021	2022
Full Board	120	62
Expedited	06	02
Exempted	03	02
Total	**129**	**66**

Table 2: IEC decision on new projects (full board review)

Full board review	2021	2022
Approved	11	41
Revision with minor modification	68	10
Resubmit (major)	34	09
Not approved	0	0
Withdrawn by PI	0	01
Deferred	0	0
Under review process	7	01
Review exempted	3	02
Total	**123**	**64**

Table 3: IEC decision on expedited review projects

Expedited projects	2021	2022
Approved	6	2
Revision with minor modification	0	0
Revision with major modification	0	0
Not approved	0	0
Total	**6**	**2**

Table 4: IEC decision on (full board + Expedited) projects carried forward previous years (n=44)

Projects carried forward	2020 Full board	2021	Total
Approved	03	29	32
Resubmitted	0	0	0
Not Approved	02	0	02
Closed by IEC	0	03	03
Revision with minor modification	0	02	02
Withdrawn by PI	02	03	05
Exempted from review	0	0	0
Deferred	0	0	0
Total	**07**	**37**	**44**

Note: Carry forwarded projects to 2023: 02 Minor modification

Table 5: Summary of the source of funding

Source of funding	2021	2022
IM	14	09
EM	12	11
IM + EM	09	04
Pharma	01	04
Others	0	0
Non funded projects	93	38
Total	**129**	**66**

Achievements

- **Accreditation:** Institutional Ethics Committee III, Tata Memorial Centre has been assessed and found to comply with NABH Accreditation Standards for

Ethics Committee (E.C) under clinical trial program. This certificate is valid upto 10.12.2023 subject to continued compliance with NABH Accreditation programme

Education: Training and Education for EC members:

Sr no.	Training details	Training conducted by	Meeting Dated
1	Over view of EC, COI and COA Management Over view of SOPs Use of Portal Review of new projects and revised projects Responsibilities of IEC Members (Ethical review) Q and A Session IEC III common policies	Sudhir Nair Kasturi	22.04.2022
2	Overview of SOP Use of portal for Initial and Re-review of projects	Kasturi	23.05.2022
3.	Overview of SOP Use of portal for Initial and Re-review of projects	Kasturi	03.06.2022
4	NDCT Guidelines	Dr Renuka Munshi	14.06.2022
5.	Overview of HMSC guidelines	Mr. Akil Hirani and Ms. Sajiri Tengashe	24.06.2022
6.	Overview of NDCT Rules 2019	Dr. Sangita Sukumaran	15.07.2022
7.	Overview of NDCT Rules and 3rd Amendment of NDCT Rules 2022	Akil Hirani	16.12.2022

Future Steps: Reduction in carbon foot prints by going more paperless for all kinds of communications to and from the IEC.

Research Projects Approved by IEC III-2022

PI_LIST	PROJECT_TITLE
Dr. Abhishek Mahajan	Role of imaging in characterization of thyroglossal cyst lesions and in their management protocols and clinical outcomes.
Dr. Abhishek Mahajan	Role of MRI in predicting outcomes in carotid body tumours.
Dr. Abhishek Mahajan	Role of CT imaging in addressing the resectability issues in thyroid cancer.
Dr. Amit Janu	Retrospective study of multimodality imaging features of chondroblastoma.
Dr. Amrita Guha	Evaluating the role of imaging in predicting anterior CRM in low anterior rectal cancer (anterior CRM study)
Dr. Amrita Guha	TUMOR RADIOMICS AS MOLECULAR ADJUNCT FOR DIFFUSE LARGE B CELL LYMPHOMA(TRAMADoL study)
Dr. Anant Gokarn	Randomized Trial to Study the Effect of Rifaximin on Gut Microbiome Diversity post Allogeneic Stem Cell Transplant.
Dr. Ashish Gulia	Oncologic and functional outcomes of surgical treated clear cell sarcomas
Dr. Ashwini Budrukkar	Patterns Of Failure In Oropharyngeal Cancers after radical Intensity Modulated Radiation Therapy
Dr. Avanish Saklani	Robotic multi-visceral resection for locally advanced rectal cancer-an international multicenter study
Dr. Bhakti Trivedi	A retrospective observational study to evaluate the blood transfusion practices in paediatric surgeries at a tertiary care cancer institute in India
Dr. Bhausaheb Bagal	A phase IIb multicenter, randomized controlled trial comparing a generic triplet combination of Bortezomib-Pomalidomide-Dexamethasone vs Bortezomib-Lenalidomide -Dexamethasone in patients with newly diagnosed multiple myeloma.
Dr. Bhausaheb Bagal	A Multicenter Retrospective Study to understand the clinical characteristics, treatment pathway and resource utilization for patients with chronic lymphocytic leukemia
Dr. Bindiya Salunke	Operation theatre utilisation in a tertiary care cancer center: a retrospective audit
Dr. Gagan Prakash	A Phase II study to evaluate oral chlorophyllin in haemorrhagic cystitis secondary to radiation therapy for pelvic malignancies (CLARITY Trial)

Dr. Indraneel Mittra	An investigation into the origin of extra-chromosomal DNA in human tumours
Dr. Indraneel Mittra	Are metastatic tumours histologically similar to the primary?
Dr. Jayant Goda	A mechanistic and translational approach to delineate the cellular and molecular mechanisms of chemo-radioresistance in cervical cancer
Dr. Jigeeshu Divatia	To evaluate the outcomes of SARS-CoV2 omicron variant related infections in the oncological patients admitted to the ICU
Dr. Jyoti Bajpai	Retrospective study of practice patterns of systemic therapy in Adult Ewing's Sarcomas
Dr. Jyoti Kode	Deciphering dynamics of inflammasome innate immune pathways in oral cancer
Dr. Jyoti Kode	Understanding mechanistic role of Carctol-S as immunomodulatory and anti-cancer formulation against Ovarian Cancer
Dr. Jyoti Kode	Understanding mechanistic role of CARAF & CAGHE as immunomodulatory and anti-cancer compounds against pre-clinical models of Leukemia, Lymphoma, Melanoma, Lung and Breast cancer
Dr. Kedar Deodhar	Endometrioid carcinoma of endometrium, FIGO grade 3:Histopathology retrospective review
Dr. Kunal Gala	Retrospective analysis of diagnostic accuracy of image guided pancreatic biopsy.
Dr. Manju Sengar	Outcomes and prognostic factors in patients with Burkitt's lymphoma: real world data
Dr. Manju Sengar	Global outcomes of novel agents versus traditional multiagent chemotherapy for patients with relapsed and refractory peripheral T-cell and NK/T-cell lymphoma.
Dr. Manjunath Nookala	A multi-centric study for the validation of the SNG algorithm for causality assessment of adverse events
Dr. Manjunath Nookala	A Single Ascending Dose, Phase I Trial to Assess Safety, Tolerability and Pharmacokinetic Profile of MSP008-22 in Patients with Advanced Solid Tumours
Dr. Neha Mittal	Isolated Histoplasmosis of the Head And Neck Region Mimicking Malignancy: a retrospective clinic-pathological review
Dr. Neha Mittal	(Hyalinizing) Clear cell carcinoma, NOS of the salivary glands: a clinicopathological study
Dr. Nikhil Patkar	N Gene Target Failure (NGTF) for detection of Omicron: a way out for the 'stealth' too?
Dr. Nikhil Patkar	Acute Myeloid Leukemia and the Clonal Trajectories of Relapse

Dr. Nikhil Patkar	Whole Genome Sequencing Based Interrogation of ETV6::ABL1 rearranged hematolymphoid malignancies
Dr. Nivedita Chakrabarty	CORRELATION OF MRI WITH HISTOPATHOLOGY AND INTRAOPERATIVE FINDINGS FOR PAROTID GLAND TUMORS
Dr. Palak Popat	Retrospective study of the imaging features of breast masses seen on mammography by machine learning algoritghms to reflect biomarker status of the tumors
Dr. Pankaj Chaturvedi	Advanced tongue cancers: A Surgical audit
Dr. Pankaj Chaturvedi	Elucidating the genetic basis of tobacco related oral cancer: role of pharmacogenetic variants of urinary tobacco biomarkers
Dr. Poonam Joshi	Defining and predicting early recurrence in head and neck cancers
Dr. Poonam Joshi	Financial Toxicity in Head and Neck cancer patients and its relation with health related QOL
Dr. Poonam Joshi	Randomized controlled trial comparing Octreotide with standard treatment (diet restriction) versus standard treatment for chyle leak in head and neck cancer patients.
Dr. Poonam Joshi	A Cross-sectional survey to assess the Oncologists' opinion on Functional Inoperability in management of advanced Head and Neck cancers in India.
Dr. Poonam Joshi	Prospective observational study of islanded Melolabial flaps done for reconstruction of tongue defects
Dr. Poonam Joshi	Retrospective clinicopathological review of Lip Carcinoma
Dr. Poonam Joshi	Clinicopathological review of verrucous lesions of oral cavity
Dr. Prashant Tembhare	A retrospective study of immunophenotypic profile and other clinicopathological features of acute myeloid leukemias not-otherwise specified (AML-NOS): An international collaboration
Dr. Pritha Ray	Investigating the role of RUNX1 and ID proteins for targeting the Cancer Stem Cell population in primary and relapsed Epithelial Ovarian Cancer
Dr. Reena Engineer	Stereotactic Body Radiation Therapy(SBRT) in liver tumors - Dosimetric and clinical Outcomes
Dr. Reshma Ambulkar	Patient Perspectives on a Separate Informed Consent for Anaesthesia - A Single-arm Prospective Cohort Analysis in Patients Undergoing Major Onco-surgeries
Dr. Sachin Punatar	Lenalidomide with or without dexamethasone for relapsed or refractory Hodgkin Lymphoma post Autologous Stem Cell Transplant.
Dr. Sanjay Gupta	Understanding the role of molecular alterations in recurrent HCC: a potential use of epidrugs
Dr. Sanjay Gupta	Histone acetylation and histone deacetylase activity in cancer: A proof-of-principle study for exploring the potential of HDACi therapy in combination with standard chemotherapeutic drugs in gastric cancer

Dr. Sanjay Gupta	Exploring liquid biomarker for HCC: Secreted phosphoprotein 24for diagnosis and prognosis
Dr. Sanjay Gupta	Profiling differential levels of chromatin modifiers and proteins associated with histone biogenesis in breast cancer
Dr. Sarbani Ghosh Laskar	Patterns of Failure and Outcomes in Carcinoma of Unknown Primary of the Head & Neck
Dr. Sejal Patwardan	A pilot study to assess quality of plasma extracted using 'Blood Plasma Separation Micro-device' for Liquid Biopsy application
Dr. Shalaka Joshi	A retrospective audit of utility of MRI in planning of breast surgery- A single institution experience
Dr. Shashank Ojha	ANALYSIS OF DONOR SAFETY AND PRODUCT QUALITY IN PEDIATRIC PERIPHERAL BLOOD STEM CELL HARVESTS
Dr. Shiva Kumar Thiagarajan	Oro-cutaneous fistula: proposal for a new grading system for a common complication following oral cancer surgery
Dr. Shripad Banavali	Standardization and validation of ctDNA based testing in Lung Cancer for detection of clinically important actionable driver mutations using Next Generation Sequencing
Dr. Sorab Dalal	Establishment of Signet ring cell cancer (SRCC) organoids and PDX models to identify therapeutic vulnerabilities.
Dr. Subhash Yadav	Anorectal Melanoma: Clinicopathological features and correlation with survival-Prognostic model
Dr. Sudhir Vasudevan Nair	Development and Evaluation of Tools for Detection of Oral Cancer (TDOC)
Dr. Sudhir Vasudevan Nair	Modified Nasolabial flap and Trans facial Approach for Resection and Reconstruction of Retromolar Trigone tumors - A retrospective audit
Dr. Sudhir Vasudevan Nair	Developing a Nomogram for Preoperative Estimation of Length of Hospital Stay after Oral Cancer Surgery
Dr. Sumathi Hiregoudar	Effect of Plateletpheresis on Iron Stores among Repeat Voluntary Male Platelet Donors-A single tertiary care hemato-oncology center experience
Dr. Sumeet Mirgh	Daratumumab for Minimal Residual Disease Eradication in T-Acute Lymphoblastic Leukemia - A Phase 2 Study
Dr. Sweta Rajpal	A retrospective audit of RNA sequencing data of pediatric B-ALL
Dr. Vasundhara Patil	EVALUATE THE ROLE OF IMAGING IN THE MANAGEMENT OF OVARIAN GERM CELL TUMOUR IN PEDIATRIC PATIENTS.
Dr. Vedang Murthy	Ga68-PSMA PETCT and MR guided Boost for intra-prostatic dose Escalation (PROBE)

Dr. Vedang Murthy	Common iliac node positive prostate cancer treated with curative radiotherapy N1 or M1a?
Dr. Vedang Murthy	PSMA PET CT or Conventional Imaging for High-risk Prostate Cancer treated with radical radiotherapy: Comparison of Outcomes
Dr. Vedang Murthy	Predictive value of Ga68-PSMA PETCT-based response to neoadjuvant androgen deprivation therapy in prostate cancer treated with radical radiotherapy.
Dr. Vikas Singh	Retrospective Evaluation of Radiomic Features of Intraoperative Ultrasound to Predict Survival in Glioblastoma Patients – An International Collaborative Study
Mrs. Reena Devi Phurailatpam	Indigenously developed 3D printed phantoms for Radiotherapy quality assurance program

Data Safety Monitoring Unit (DSMU- III) ACTREC

Member Secretary: Dr. Sachin Punatar

The Data Safety Monitoring Unit (DSMU), a unit of the IEC-III at Tata Memorial Centre is responsible for monitoring of patient safety during the course of the study in a manner that ensures the scientific and ethical integrity of the study. The DSMU comprises of an intensivist, basic scientists, medical oncologists, surgical oncologists and radiation oncologists. The members of the DSMU are trained in causality assessment as per WHO criteria and routinely implement the criteria in assessing the relatedness of adverse events.

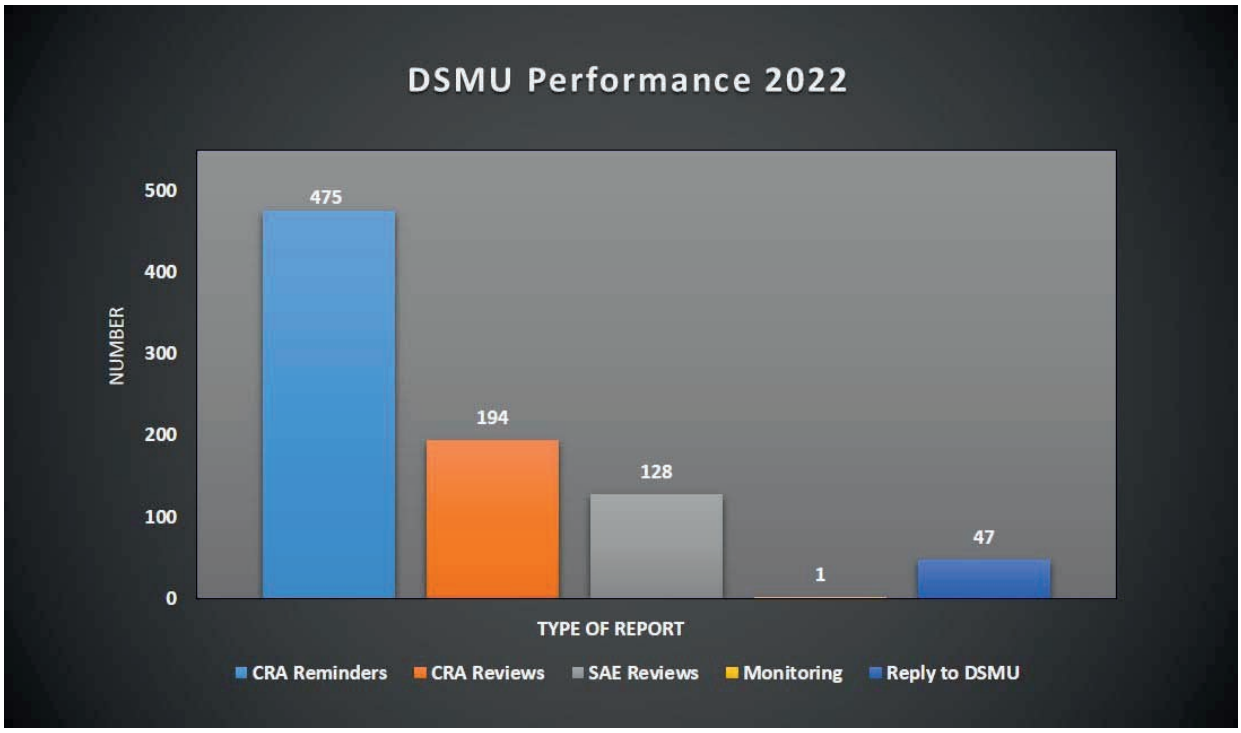
The composition of the current DSMU (1st April 2022 to 31st March 2024) is as given below:

Sr. No.	Name & Position	Affiliation	Gender	Expertise
1	Sachin Punatar, Member and DSMU Secretary	Prof. Medical Oncology, E (Adult Hematolymphoid) ACTREC, TMC	Male	Clinician Onco
2	Manjunath Nookala Krishnamurthy, Joint Secretary	Scientific Officer F (Clinical Pharmacology)	Male	Clin Pharma
3	Dr Anant Gokarn, Member	Prof. Medical Oncology, E (Adult Hematolymphoid) ACTREC, TMC	Male	Clinician Onco
4	Dr Shwetabh Sinha, Member	Asst. Professor, Dept. of Radiation Oncology, ACTREC, TMC	Male	Clinician (Onco
5	Dr Madhura Sharma, Member	Asst. Professor. (Dental AND Prosthetic Surgeon)	Female	Clinician Surg
6	Dr, Sejal Patwardhan, Member	Scientific Officer D, ACTREC TMC	Female	Basic Sc
7	Debashree Lahiri, Member	Asst. Professor, Anesthesia, TMH TMC	Female	Clinician(A
8	Rohan Khadilkar, Member	Scientific Officer D, ACTREC TMC	Male	Basic Sc
9	Mrs. Reena Devi Phurailatpam, Member	Scientific Officer 'E' Medical Physicist 'E' Radiation Oncology, ACTREC TMC	Female	Medical
10	Sumeet Mirgh, Member	Asst. Prof. Medical Oncology, (Adult Hematolymphoid) ACTREC, TMC	Male	Clinician Onco

The important responsibilities of the Committee: Review of Serious Adverse Event reports (SAEs); Monitoring of overall progress of institutional (investigator initiated) trials and for cause monitoring of other trials as requested by the IEC; Initial review of Continue Review Application/ Annual Status reports and review of Site Monitoring Report.

DSMU Activities

The DSMU conducted 12 meetings (Hybrid) in the year 2022, and the minutes were forwarded to IEC for further action. Besides the scheduled monthly meetings and review of SAEs reported on all the studies, SAEs on regulatory trials were evaluated continuously (to meet the 30 days' timeline) on email by a group of four members consisting of the two lead discussants and Member Secretary of DSMU and IEC. The committee conducted 01 site monitoring visit, reviewed 128 SAE reports from 14 projects (71events) and sent 475 reminders to PIs for Continue Review Application submission. A detailed initial review of 194 Continue Review Applications (CRA) was done by DSMU Member Secretary and comments from the DSMU were forwarded to the IEC for further action. At every IEC meeting, the DSMU Member Secretary or representative of the DSMU presented the minutes of DSMU meeting to IEC for further action. One monitoring report was discussed in the full board (Three SAE reports +6 CRAs will be carried forward to 2023 for further decision) and based on IEC comments, recommendation and query letters were issued to PIs. A total of 47 replies were reviewed by DSMU and their comments were forwarded to IEC.



Activities:

- Maintaining and updating a database for internal SAEs occurring at ACTREC that help in following up on significant events that have occurred on the trial.

Academics at ACTREC

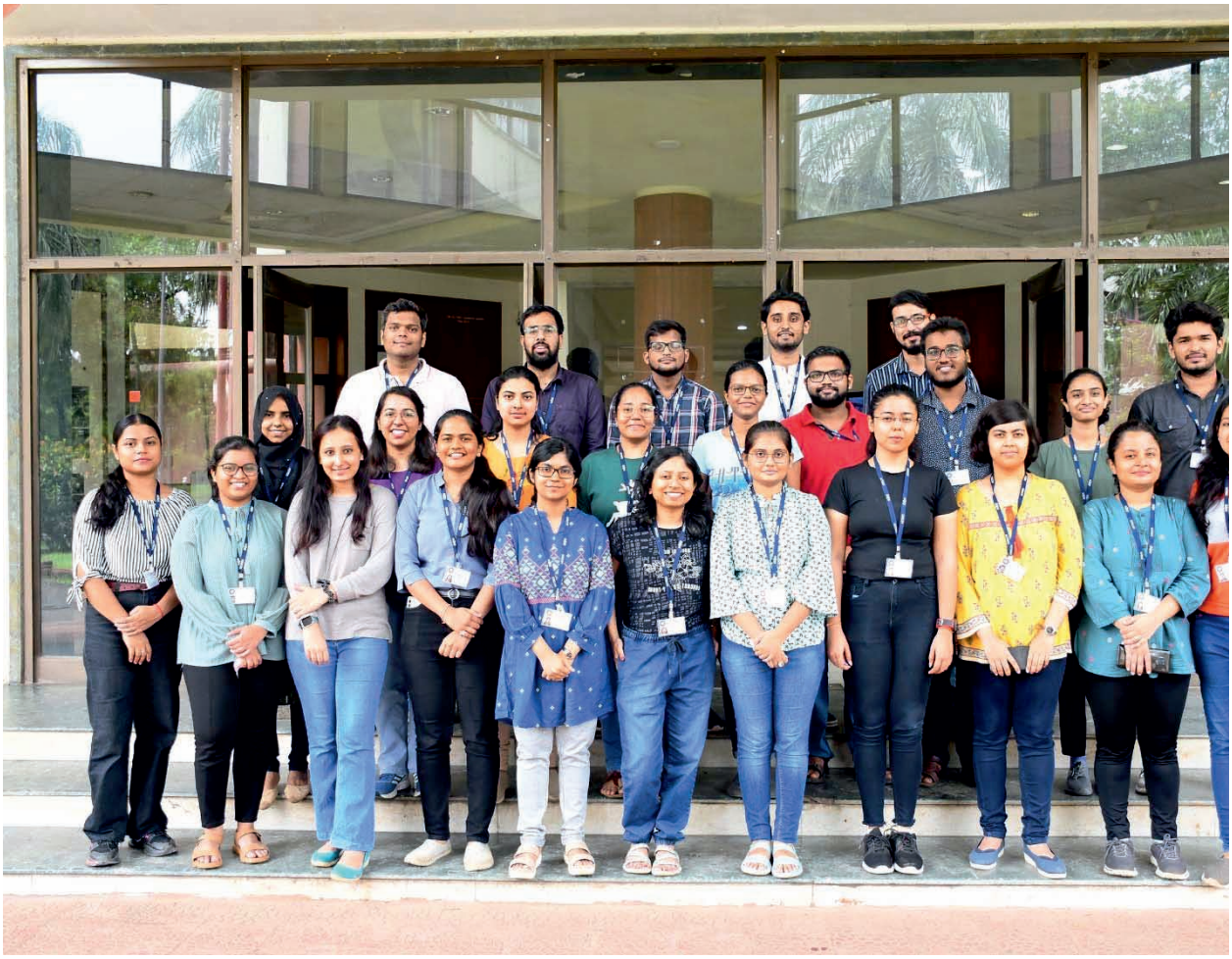
Education is one of the three mandates of ACTREC, and the on campus environment is strongly supportive of Academics. The Centre's educational endeavors include: (a) its Ph.D. program that accepts research scholars from across the country through an online written examination followed by interview to conduct doctoral research, (b) its training program that accepts undergraduate and postgraduate students from colleges and universities from within and outside India, (c) its organization of local, national and international Conferences, Symposia, Workshops and Training Courses in the Biological/ Life Sciences as well as CMEs and CNEs on various disciplines within oncology, (d) its conduct of research seminars delivered by visiting national/ international scientists and clinicians, (e) its acceptance of educational visits from college/ university students from across the country, and conduct of an Open Day at the Centre to showcase some of its research facilities, and (f) conduct of a National Research Scholars Meet by its research scholars. The Centre also conducts a public outreach program to create cancer awareness. Faculty and staff members are encouraged to attend CMEs, CNEs, workshops and training courses and to present their findings at national/ international conferences. The academic fervor on campus is strengthened by the regular in-house data presentations and journal clubs conducted by basic and clinical scientists.

Doctoral Program

The Academic and Training Program Office, chaired by Dr. Sorab Dalal, oversees the Ph.D. (Life Sciences) program at ACTREC, which is affiliated to the Homi Bhabha National Institute (HBNI) - a deemed university established in 2006 under the aegis of the University Grants Commission and covers all the constituent units of the Department of Atomic Energy, Government of India. The Program Office maintains a close liaison with HBNI to resolve any queries, conducts the students' annual doctoral committee (DC) meetings and ensures that at least four DC meetings are held during their tenure, collates documentation of these meetings, and submits the reports to HBNI. The Office also handles the pre-synopsis documentation, submits synopses and theses (spiral bound/ final bound) to HBNI, corresponds with external examiners and HBNI, conducts the open viva voce, and submits final reports to HBNI. The Academic Committee of ACTREC oversees the smooth running of the JRF-ACTREC entrance examination and doctoral program with support from SCOPE Cell and Steno-pool for student intake and academic

coursework, from ACTREC Administration for enrolment and fellowship matters, and from the Program Office for HBNI matters.

Between January and December 2022, a total of 117 graduate students were working towards the Ph.D. degree in Life Sciences at ACTREC; these included 25 JRF 2022 batch students who joined between August and September- 2022(see photograph below).



Award of the Ph.D. Degree in Life Sciences (HBNI)

During the year 2022, 13 students completed research towards their doctoral dissertation and were awarded the Ph.D. degree (see the tabulation that follows).

21 February	**Characterization of pathways that promotes tumorigenesis, radio and ch upon PKP3 loss** Ms. Nazia Chaudhary, ACTREC-SRF, Sorab Lab
3 March	**Deciphering the transcriptional regulation of differentially expressed H2A i** Mr. Sanketkumar Girishkumar Shah, ACTREC-SRF, Gupta Lab
7 March	**Deciphering functional role of the genetic alterations in medulloblasto malignant brain tumour in children**

	Ms. Shalaka Arun Masurkar, ACTREC-SRF, Shirsat Lab
11 March	**Delineating the molecular mechanism(s) involved in regulating the expressio in human cancer** Mr. Mudasir Rashid, ACTREC-SRF, Gupta Lab
18 May	**Genomic profiling of blast cells from different clinical stages of CML** Mr. Rahul Mahendra Mojidra, ACTREC-SRF, Rukmini Lab
25 May	**Proteomics studies of a set of predictive and prognostic protein biomarker neck squamous cell carcinoma** Ms. Lipi Ashok Das, UGC-SRF, Varma Lab
1 June	**Evaluation of Gold-nanosphere Based Photothermal Therapy Potential in Mc Cancer** Mr. Sumit Kumar Mishra, ACTREC-SRF, De Lab
22 June	**The role of 14-3-3ε in regulating development of the epidermis** Ms. Sarika Kishan Tilwani, ACTREC-SRF, Sorab Lab
18 July	**Investigating the signaling mechanisms in radioresistant glioblastoma** Ms. Jyothi Nair, CSIR-SRF, Shilpee Lab
17 August	**Functional relevance of protein-protein interactions- a case study with chaperones** Mr. Sheikh Burhan Ud Din Farooqee, ACTREC-SRF, Prasanna Lab
19 September	**Understanding the complexities of human Lung Cancer Genome** Mr. Asim Sandeep Joshi, ACTREC-SRF, Dutt Lab
30 September	**Allosteric Regulation of Serine Protease HtrA2** Ms. Aasna Parui , ACTREC-SRF, Bose Lab
1 November	**Genomic approaches to identify novel endogenous and exogenous gene associated with human cancer** Mr. Sanket Desai, ACTREC-SRF, Dutt Lab

Training Program

ACTREC's training program encompasses (a) undergraduate/ graduate students seeking to work on small projects for their Bachelor's/ Master's dissertation, (b) individuals who have completed studies and wish to gain research experience, (c) undergraduate students who come as summer trainees during their college break, and (d) students of colleges/ universities or staff of hospitals who pay short visits as observers to learn specific techniques. ACTREC's training program had 285 participants during 2022, of which 88 trainees worked towards their MSc dissertation, 7 were on collaborative projects, 115 trainees came for research experience, 54 were observers, 2 were Research Associates, 16 were summer trainees, 1 was a FHNO fellow and 2 were visiting scientists. The trainees worked under the close supervision of senior or mid-level scientists, clinicians and other officers.

Advanced Training Course in Medical Laboratory Technology

The Advanced Training Course in Medical Laboratory Technology (AMLT), conducted jointly by Dr. Preeti Chavan, Dr. Vivek Bhat and Dr. Shashank Ojha who are in charge of the diagnostic laboratories of ACTREC, is designed to provide both theoretical knowledge and practical training leading to advanced specialization in various medical laboratory technologies. Coursework is designed in such a way that, at the end of the course, the student is able to work as a skilled technologist under the supervision of consultants in an accredited laboratory attached to a hospital or in a small, independently functioning laboratory carrying out advanced tests with effective quality control and provide patients with reliable reports. The duration of the course is one year, and the course is followed by a bond period of one year. The AMLT course was started at ACTREC in November 2015 and the first batch comprising of two students completed their coursework in November 2016 and served the bond period until November 2017. In 2021, the report year, four students were registered and undergoing training for the AMLT course Using state-of-the art instrumentation such as automated analyzers and advanced technologies, the AMLT students receive hands-on training in Hematology (CBC, coagulation, cytochemistry, manual differential count and body fluid cell count), Clinical Biochemistry (routine biochemistry, tumor marker/ drug assays, and calibration of tests), Microbiology (bacteriology, mycology, clinical microbiology, serology and media preparation), Histopathology (sample accession, grossing, tissue processing, embedding, trimming/ cutting, staining and submission of stained slides, frozen section and immunohistochemistry) and Transfusion Medicine (medical screening of blood/ platelet donors, outdoor blood camps, apheresis, blood component separation, transfusion transmitted infection testing, blood grouping, cross-matching, antibody titration as well as procedures for hematopoietic stem cell transplant). They also participate in academic activities, and receive training in the implementation, interpretation and documentation for internal quality control programs, as well as the external quality assurance programs of these departments. In 2022, one student enrolled for the advanced training course in Medical Laboratory Technology.

Educational Visits

To provide an exposure to students, ACTREC facilitates the educational program tours of various institutes. The educational visits begin with an overview of research and clinical activities of ACTREC followed by visits to various departments and facilities of the Centre.

From the end of March 2020, the Centre did not encourage visits due to the world-wide pandemic of COVID-19. The staff and students were strictly following the pandemic protocol and the Centre was adhering to all the rules and regulations laid down for combating the pandemic. The pandemic protocol continued into the year 2021, as there were several infection waves and it was important to curtail and contain the spread of the disease.

Towards the end of the year 2021, when it was safer with more than a 100 crore adult individuals vaccinated against the novel Coronavirus in the country, ACTREC opened up for educational visits. Nevertheless in 2022 also, the number of visits were low with a total of three visits spanning from April to June. On April 21, 2022 a batch of 7 post-graduate students accompanied with their professor from the Department of Zoology, MS University of Baroda, Vadodara, Gujarat, visited the Small Animal Imaging Facility of CRI, ACTREC and the visit was overseen by the OIC- Dr. Pradip Chaudhari. In May, post-graduate students from the Department of Nursing, Bharati Vidyapeeth Navi Mumbai, and in June students from the D Y Patil College of Nursing, Navi Mumbai visited the Department of Nursing in ACTREC with the visit managed by the OIC- Dr. Meera Achrekar. These visits facilitate close interaction with experts in specific areas, initiate deeper interests and help motivate and mould careers in scientific and medical research.

Clinical Research Secretariat-ACTREC

Officer-In-Charge: Dr. Jayant Sastri Goda

Data Manager 'F': Mrs. Sadhana Kannan

Overview

Clinical Research Secretariat (CRS) is mandated to provide clinical and basic researchers at ACTREC a high-level support system for research activities including developing research methods, operations, training and education. The Secretariat's vision is to become a vital cog in the wheel for clinical research at Tata Memorial Centre so as to uphold its pre-eminence as a frontier institute for cancer research in India.

Service

The CRS at ACTREC provided scientific and technical inputs needed to support basic and clinical research investigators ranging from protocol development to manuscript publication. It has also been actively supporting Phase II and III single or multi-centric clinical trials. Statistical inputs to protocol development, randomisation services, CRF development, electronic data capture, clinical data management through REDCap and statistical analysis are key responsibilities of the department.

Type of service	Number
Statistical consultation for study design	35
Consultations for data analysis	100
Randomisation services for clinical trials	23
Data management services- Developing eCRF for clinical trials	10

Research

The lead statistician carried out advanced statistical analysis in the area of systematic reviews and meta-analysis which contributed to high impact publications. The CRS staff contributed significantly and featured as co-authors in 25 publications during the year 2022. The CRS

recently got an NBM BIRAC grant of Rs. 138 lakhs for capacity building and conducting various projects in the field of new device /drug development. Under this project, an electronic registry for capturing data on solid tumours was created at CRS which will be used to make a registry for 11 centres PAN India.

Education

The CRS has been involved in teaching biostatistics to the doctoral students of life sciences, MSc Nursing and Masters in Occupational Therapy course under HBNI both for ACTREC/TMH and the junior residents of Radiation Oncology at TMH. Four students have been trained under post graduate diploma course in Biostatistics for a period of one year. The lead statistician, (Mrs. Sadhana Kannan) is pursuing a PhD in Health Sciences. On-the job training was also imparted to junior statisticians of CRS-TMH. Biostatistics training is being imparted weekly to 11 centres under BIRAC project. CRS statisticians have given lectures and attended various webinars, training workshops in clinical research methodology held at various places across the country.

CRS staff organized and were deputed as Faculty for Protocol Development Workshops and Clinical Research Methodology course as given below

Name of the workshop	Organised by	CRS Faculty	Period
AAzpire Protocol development workshop	ACTREC supported by Aztrazeneca	Dr. Jayant Goda Sastri Mrs. Sadhana Kannan	April 2022
PANACEA	ACTREC supported by Pfizer	Dr. Jayant Goda Sastri	June, 2022
ACORD	ACORD, Australia	Mrs. Sadhana Kannan	October, 2022
International Cancer Congress, Dhaka, Bangladesh		Dr. Jayant Goda Sastri Mrs. Sadhana Kannan	November, 2022

Open Day 2022



The ACTREC Open Day is an eagerly awaited event by the undergraduate and graduate science college students of Mumbai and Navi Mumbai region. The Open Day 2022 organized by the SCOPE Cell was held on two days; 1st and 2nd of December 2022. The response to the Open Day invitation received from various science colleges was overwhelming after the two years pandemic period. In these two days, over 500 students and 37 faculty from 34 colleges from Mumbai and Navi Mumbai visited to witness the live experiments and research infrastructure of the Centre. The live demonstrations arranged by the scientists in 6 research laboratories in CRI included Lab Animal Facility, Macromolecular Crystallography, Nandini Lab, Rukmini Lab, Sanger sequencing, Small Animal Imaging Facility; 2 clinical facilities in CRC include Composite Lab and Microbiology Departments. An interactive session with ACTREC research students' council was well received and appreciated by the student visitors. In the welcome address, Deputy Director, CRI, Dr. Prasanna Venkatraman interacted with the young and curious minds and briefed them on the objectives of Cancer Research to understand Basic Cancer Biology and the importance of the findings in treating and managing the dreaded disease. The messages and feedback from faculty who visited during these two days endorse the success of the event.

18th National Research Scholars Meet in Life Sciences (NRSM 2022)





The 18th National Research Scholars Meet was held at ACTREC in December 7- 9, 2022. The students of ACTREC, who organize this event each year with flair and enthusiasm, bring the best of speakers from across the country, and sometimes overseas. Some of the eminent scientists from different institutes who have graced the NRSM hall of fame over these years, to name a few were, Padma Bhushan Prof. P. Balaram (Director, IISC), Prof. S. C. Lakhotia (BHU), Prof. Satyajit Mayor (Director, NCBS), Prof. M. G. Deo (Vice President, Moving Academy of Medicine and Biomedicine), Prof. Rajesh Gokhale (Director, IGIB), Dr. Satyajit Rath (NII), Dr. Pranoti Mandrekar (University of Massachusetts, USA), Dr. Sanjeev Galande (IISER), Prof. Dr. Jayant Narlikar (Emeritus professor, IUCAA), Mr. Sonam Wangchuk (Director, SECMOL), Dr. Bharat Vatwani (Ramon Magsaysay awardee) and Dr. T. Ramasami (Padma Bhushan, Padma Shri awardee

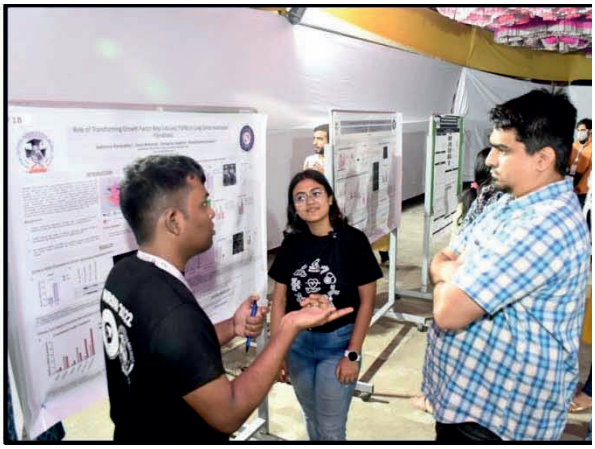
In the year 2022, the esteemed Chief Guest was **Padma Shri, Prof. Aditya Prasad Dash** (VC, AIPH University), and other eminent speakers were Shanthi Swaroop Bhatnagar Awardee Dr. Ganesan Venkatsubramanian (NIMHANS), Dr. Rahul Purwar (IIT-B, ImmunoAct Inc.), Dr. Malay Patra (TIFR), Dr. Shashank Tripathi (IISc), Dr. Samir Khariwala (University of Minnesota), Dr. Kumar Prabhash (TMH), Dr. Kalpita Gawit (ICMR-NIIH), Dr. Jayendra Shinde (Crosscope Inc.), and Dr. Abhijit Majumder (IIT-B).

For the 2022 meeting, the organizers had chosen the theme- "**Navaritee: Research and Innovation in Conquering Diseases**". The aim was to propagate information flow on modern innovations towards disease diagnosis and management. Towards this, deliberations were on

novel advancements in early disease screening, diagnosis and therapeutics (such as vaccines, antibiotics, cell therapy and technology). The topic for panel discussion was, "Bridging the gap to improve healthcare at the grassroots level". After the COVID-19 pandemic which severely impacted lives globally, the dire need for a robust healthcare system which could reach the grassroots' was realised by all. To have a stimulating discussion on this extremely important topic, there were eminent panellists on board involving clinicians, researchers and social workers. Ultimately, there were discussions on the future of disease management such as AI based diagnosis and personalised therapeutics.

The meet began with a welcome address by Dr. Prasanna Venkatraman, (Deputy Director, CRI, ACTREC) and Dr. Navin Khattry (Deputy Director, CRC, ACTREC). Following the welcome addresses, the abstract book was released by Dr. Prasanna Venkatraman (Deputy Director- CRI) and Dr. Navin Khattry (Deputy Director-CRC), along with the esteemed Chief Guest Prof. A.P. Dash. The series of lectures commenced with an inspiring talk by the Chief Guest, Prof. A.P. Dash on the management, mitigation and prevention of critical vector-borne diseases. Following this, there were excellent talks from speakers such as Dr. Rahul Purwar who shared his endeavour in creating CAR-T cell therapy an affordable platform for cancer treatment, Dr. G. Venkatsubramanian who spoke on the implication of "predictive processing" of the brain in neuromodulation and neurobiological aberrations, Dr. Malay Patra who gave an insight into the design and efficacy of different generation of polypharmacological compounds, Dr. Shashank Tripathi who illuminated how OMICs technology platforms has revolutionized the way Virus-Host interaction is studied and can be employed to identify druggable targets, Dr. Samir Khariwala who signified the implication of tobacco consumption in the prevalence of head and neck cancer, Dr. Kumar Prabhash who showed how metronomic chemotherapy is an exciting and economically attractive form of patient care, Dr. Kalpita Gawit who elaborated on the importance of increasing the awareness and acceptance of pre- and post-natal diagnosis of sickle cell anaemia in the tribal population of India and Dr. Jayendra Shinde who showed us how artificial intelligence based digital pathology can produce highly precise, unbiased, consistent and quick diagnosis can personalise and revolutionise health care. There was a special off-theme discussion on "Researchers: In search of life" by Dr. Abhijit Majumder who had an enthusiastic interaction with the audience and shared his survival hacks with young researchers.





Apart from the keynote addresses by eminent scientists and clinicians from prestigious institutes, NRSM 2022 featured stimulating oral and poster presentations by research scholars and post-docs from all over India. An important highlight of the conference included a pre-conference hands-on workshop on confocal microscopy organized in collaboration with Nikon where students got the opportunity to learn from sample processing to data analysis of Microscopy. Along with developing the scientific aptitude, the 18th NRSM also promoted the creative talent hidden in the researchers. The Meet hosted “Creative Corner”, an event for showcasing participants’ talent in photography, painting, and poetry. A cultural evening was also arranged that enthralled the audience followed by a gala banquet dinner.

The two-day conference ended with a valedictory function where awards were presented to the winners of oral and poster presentations, and the winners of the creative corner. The meet was summarized by the Deputy Director, Dr. Prasanna Venkatraman and a vote of thanks was delivered by the organizers. The ‘Meet’ was sponsored by BD Biosciences, Beckman Coulter Life Sciences, Zydus and Nikon to make it a worthy and successful meeting. Selected abstracts will be published as citable abstracts in Indian Journal of Medical and Paediatric Oncology. The 18th NRSM proved to be a successful event which aimed to enhance communication among research scholars, eminent scientists and clinicians leading to a successful culmination into a scientific output, which would ultimately benefit society as a whole.

Conferences, Workshops, Seminars, EBMs & CMEs

Workshops (12)

21 March	**Proteomics Day: One Day Workshop on 'Analytical, Functional & Structural Proteomics'** Coordinator : Mr. Shashadhar Dolas, Scientific Officer 'D', Mass Spec Facility
9 April	**Security Communication Skills Training Workshop on 'Soft Skill'** Security Department, ACTREC
26–27 April	**"Multicolor Live Cell Sorting", Hands-on Training Workshop** Organized by Flow Cytometry Facility, ACTREC, TMC and BD Biosciences
28 April - 1 May	**AAZPIRE Workshop on Clinical Research Methods** Program Director – Dr. Vikram Gota, Professor & Officer-in-charge, Department of Clinical Pharmacology, ACTREC, Mumbai
3 – 4 June	**NGS-Hands on workshop on Hereditary Cancer** Organizer : Dr. Rajiv Sarin
24-25 August	**Workshop on Single Cell Genomics** Organizer : Dr. Syed Hasan
16–18 November	**3rd Cytogenetics Workshop 2022: Hands on Training and Workshop** Organizing Secretary – Dr. Dhanlaxmi Shetty, OIC, Cancer Cytogenetics, ACTREC
17-19 November	**LAF Workshop - Workshop on "Monitoring of Genetic and Mirobiological Status of Small Laboratory Animals for Production of Quality Animals"** Organizer : Dr. Arvind Ingle, ACTREC
1-2 December	**ACTREC Open Day 2022** Coordinator : Dr. Satish Munnolli & Dr. Ojaswini Upasani, ACTREC
12-14 December	**11th Hybrid Workshop on "Preclinical Imaging and Drug Discovery"** Organizer : Dr. Pradip Chaudhari, ACTREC
15 December	**Improving Academic Writing with Grammarly** Organizer: Dr. Satish Munnolli
16 December	**Miltenyi Workshop** Organizer : CTCTC, ACTREC

Azadi Ka Amrit Mahotsav – AKAM Events (19)

24-25 August	**Workshop on Single Cell Genomics** Organizer : Dr. Syed Hasan **Wednesday, 24th August, 2022** **Biology at True Resolution : Resolving complex biology at Single cell level** Sachin Minhas, PhD, Product Manager - Genomics, Premas Life Science **Tips & Tricks - Sample collection & Storage for SC Genomics Experiments** **Experimental Workflow – SC 3'GEX library preparation – Practical Session** Shivaji Mante, Assistant Manager - FAS, Premas Life Sciences. **Thursday, 25th August, 2022**

	3'GEX library preparation – Practical Session QC on Qsep Shivaji Mante **Data Analysis – Cell Ranger & Loupe browser demonstration** Rajavarman Kittu, Senior Bioinformatician, Premas Life Sciences.
22–27 August	**75 Azadi Ka Amrit Mahotsav – AKAM activities organized at ACTREC** **Monday, 22nd August,2022** Open day - 8-10 colleges students CRI lab, dept., facility tour. Inauguration of motivational quotes posters (4ft by 2ft) fixed in co-ordinat with DIYA foundation (Mr. Kaul) in patient centric areas. Talk on infection control for employees (Basics for hospital health and hygi protocols, Hand washing, vaccines mandatory) Focused Group Discussion: By National Tobacco Quit line Services , CCE for patients and patients relatives on tobacco awareness and toba cessation Venue: Blood Collection Centre Waiting Area, 1st Floor, Pay Mas Shodhika **Tuesday, 23rd August, 2022** Focused Group Discussion: By National Tobacco Quit line Services, CCE for patients and patients relatives on tobacco awareness and toba cessation Venue: Morgan Stanley Patient Waiting Area, Ground Floor Pay Mas Shodhika A Talk on Ethics: Animal Research for Students of Cancer Research Institute Dr. P.R. Chaudhari, Scientific Officer 'G' Animal Oncology Group. Sapling Plantation by students. **Wednesday, 24th August, 2022** A Talk on Vaccine Development in India – Prof. Gagandeep Kang Tobacco Awareness Session and Focus Group Discussion, Venue: OPD Patien Waiting Area, Second Floor, Paymaster Shodhika, ACTREC **Thursday, 25th August, 2022** 1. Blood Donation Camp at Pillai College of Engineering, New Panvel 2. Awareness Session on Prevention and Early Detection of Cancer for population in Pen, Raigad District 3. Tobacco Awareness Session and Focus Group Discussion at Asha Nivas Patient hostel, ACTREC 4. Fire Safety Practices with Situational Learning & Practical Demonstration 5. CPR Training Session for Non-Medical Staff **Friday, 26th August, 2022** 1. Tobacco Awareness Session and Focus Group Discussion for security staf drivers and housekeeping staff of ACTREC 2. Tobacco Awareness Session at Sharon High School, Nere Village, New Panvel 3. Tobacco Awareness Session at CKT College, New Panvel **Saturday, 27th August, 2022** 1. Patient Engagement Activity by V-Care Foundation: Ganpati Idol Making and Fun Games for Patients

Conferences (4)

30-31 March, 1 April	**44th Indian Biophysical Society Meeting** Conceptual Advances in Biophysics and its Applications IBS2022 Committee
7-9 December	**18th NRSM 2022** Organizer: SCA, ACTREC
29 April (5 May in ACTREC)	**Day of Immunology 2022** **Topic – Immunology & Vaccines** Organizer : Dr. Jyoti Kode, ACTREC Event Coordinator : Dr. Ojaswini Upasani, ACTREC
27–28 August	**International Conference on Oral Rehabilitation (A journey beyond cance treatment)** Organizing Committee : Dr. Sudeep Gupta, Director, ACTREC Dr. Devendra Chaukar, HOD & Professor, Dept of Head & Neck Surgery Dr. Pankaj Chaturvedi, Professor, Dept of Head & Neck Surgery Dr. Poonam Joshi, Associate Professor, Dept of Head & Neck Surgery Dr. Madhura Sharma, Assistant Professor, Dental and Prosthetic Services

Webinar (1)

24 September	**World Cancer Research Day 2022 Webinar** Mumbai Chapter of Indian Association for Cancer Research (IACR) and ACT Tata Memorial Centre is jointly hosting a Webinar (hybrid mode)

Guest Seminars (7)

22 April	**Nutrition & Cancer - The Inflammation Connection** Prof. James R. Hebert, MSPH, ScD, Health Sciences, Distinguished Profe Director, Cancer Prevention & Control Program
20 May	**Pleiotropic Role of TRAF7 in Skull Base Meningiomas and Congenital Disease** Dr. Ketu Mishra, Research Scientist, Department of Neurosurgery, Yale Scho Medicine, New Haven, United States
4 August	**Early History of the Coronavirus: or Learning During the Lockdown** Prof. Padmanabhan Balaram, DST-YOS Chair Professor, National Centre for Biological Sciences (NCBS), Bengaluru & Former Director, IISc, Bengaluru
9 August	**Epigenome reprogramming during response to immunotherapy and cell the** Dr. Kunal Rai, Associate Professor of Genomic Medicine & Scientific Director, Epigenetics-focused translation research initiative, MD Anderson Cancer, US

28 November	**Defining breast cancer at molecular level** Prof. Sushil Kumar, Assistant Professor, Cilia Biology Lab, BSBE, IIT Bombay
	Quality control of cilia proteome Prof. Swapnil Rohidas Shinde, Assistant Professor, Laboratory of Precision Oncology, BSBE, IIT Bombay
19 December	**Therapeutic targeting of STAT3 in MDS/AML** Dr. Aditi Shastri, MD, Montefiore Medical Center, Assistant professor, Albert Einstein College of Medicine, New York, USA
21 December	**Nanomedicine in Precision Therapeutics: Current Challenges from Bench to Bedside** Dr. Debabrata Mukhopadhyay, Professor, Department of Biochemistry and Molecular Biology Department of Physiology and Biomedical Engineering and Department of Cancer Biology, Mayo Clinic College of Medicine and Science, Jacksonville, Florida

EBMs & CMEs (2)

17 – 20, February 25 – 27, February	**EBM 2022 live Webinar through online** https://www.tmcebm2022.com/login

General Seminars (3)

25 January	**The Prime Minister's Fellowship scheme for Doctoral Research** Mr. Vishal Khanna, Deputy Director, Division / Sector: BISNET, Innovation, Scien Technology Commercialization Federation of Indian Chambers of Commerce and Indus
9 February	**Intellectual Property Rights(IPRs) lecture - IPR awareness Program** **Resource person -** Dr. Suhas Kulkarni, Assistant controller of Patents and Design, Mum
31 May	**Mental Health Awareness Day** Shivali Mishra (PhD-JRF) and Mansi Joshi (PhD-SRF), Molecular Functional Imaging Lab

Staff Achievements

Banerjee Archisman

- Best Oral Presentation (Amity Oral Award): 'BEND4, a Novel Prognostic Marker for Adverse AML', 41st Annual Conference of the Indian Association for Cancer Research, Amity Institute of Molecular Medicine and Stem Cell Research (AIMMSCR), Amity University, Uttar Pradesh, Noida; March 2-5,2022.

Bhoir Lalita

- Second Runner-Up (Oral): 'Assessment of Burden among primary caregiver of post HSCT patient', NURSICON 2022, New Delhi, November 11-12, 2022.

Bose Kakoli

- Featured article in SciSoup India: 'Unraveling the Conundrum of Multitasking HtrA2-A Potential Therapeutic Target" as a part of SciSoup's Interview series named "Unfolding Science with Scisoup". Interview was based on distinctive research finding published in "Structure – Cell Press Journal".

Chakraborty Sourav

- Best Poster Award: 'Mutant p53 Mediated Regulation of Autophagy and Antioxidants Imparts Chemoresistance to Epithelial Ovarian Cancer Cells', 1st HBNI Theme Meeting on Life Sciences, Raja Ramanna Centre for Advanced Technology, Indore; September 7 - 10, 2022.

Chatterjee Gaurav

- Institutional Research Grant for "Deciphering the molecular heterogeneity in Acute Leukemia of Ambiguous Lineage at a cellular level" by the Lady Tata Memorial Trust, 2022,

Chaubal Kruti

- First Prize (Best Oral presentation): 'Association of Cytogenetic abnormalities with clinical characteristics and outcomes in Multiple Myeloma', 45th Annual Conference of Mumbai Hematology Group, Mumbai; March 12- 13, 2022.

Chavan Shyam

- Bronze award for the CAA "Talent Hunt-2021" a mega painting competition on 4th January, 2022 held from September to December 2021 at New Delhi.
- Bronze award for the CAA "Quarterly Talent Hunt-2022"-I a mega painting competition on 4th January, 2022 held from January to March 2022 at New Delhi.
- Bronze award for the CAA "Quarterly Talent Hunt-2022"-I a mega painting competition on 4th May, 2022 held from April to May 2022 at New Delhi.
- The Kala Gaurav Eminent Artist Award at Creative Art Affairs and WALHAC – Mexico in June 2022.

Chilakapati Murali Krishna

- FRSC (Fellow of Royal society of Chemistry).
- Membership of Council Members of CLIRSPEC (The International Society for Clinical Spectroscopy

Dalal Sorab

- An Indian patent application for the antibody clone 3D12B2 and its variants entitled "Antibodies against lipocalin-2 and uses thereof." has been in the Indian Patent Office on 30 July 2021 in the Official Journal No. 31/2021.
- A PCT application for the antibody clone 3D12B2 and its variants entitled "Antibodies against lipocalin-2 and uses thereof." -published.
- Elected President of Indian Association for Cancer Research (IACR)

Desai Sanket

- Second Runner-up for Translational Science Oral presentation: 'Fusobacterium Nucleatum Abundance is associated with elevated inflammation, Poor Survival and extra-capsular spread in the Early-Stage HPV-Negative Tongue Cancer', 8th National Annual Conference of ISMPOCON 2022; January 21 – 23 and 28 – 30, 2022.

Dey Pranay

- Meeting Bursary Award: 'Her2 interaction domain mutations in breast cancer patients are responsible for receptor switch and therapy failure against Her2 targeted medicines', Annual Congress of European Association of Cancer Research (EACR 2022 Congress) Seville, Spain; June 20 -23, 2022.

Dharavath Bhaskar

- 'Sitaram Joglekar Award' (Best Oral Presentation-young scientist): 'miR-944/MMP-10/AXL-axis Predict Lymph Node Metastasis in Early-Stage Tongue Cancer', 41st Annual Conference of the Indian Association for Cancer Research (IACR-2022), Amity Institute of Molecular Medicine and Stem Cell Research (AIMMSCR), Amity University, Uttar Pradesh, Noida; March 2 – 5, 2022.
- Winner for Translational Science Oral presentation: '*miR-944/MMP10/AXL-axis Predict Lymph Node Metastasis in Early-stage Tongue Cancer*', 8th National Annual Conference of ISMPOCON 2022; January 21 – 23 and 28 – 30, 2022.

Dhende Priyanka

- Second Prize (Oral): 'Standardization of 15 colour high sensitivity measurable residual disease (MRD) assessment in B-cell lymphoblastic leukemia (B-ALL) treated with novel anti-CD19 immunotherapies', 14th Annual Conference-cum-Workshop The Cytometry Society TCS-2022 Hyderabad; October 15-16,2022

Dutta Deepshikha

- Dr. J.C. Patel Best Paper Award 2022: 'Venetoclax induces autophagy and apoptosis by targeting Stat3/Bcl2 axes in arsenic trioxide resistant acute promyelocytic leukemia', Indian Society of Haematology and Blood Transfusion (ISHBT) Biswa Bangla Convention Centre, Kolkata; November 3-6, 2022.

Dutta Shubhankar

- IUPAB – D.N. Bose Memorial Poster Award: 'Dual Specificity Phosphatase 9: A Novel Binding Partner cum Substrate of Proapoptotic Serine Protease HtrA2', 44th Indian
- Biophysical Society meeting entitled Conceptual Advances in Biophysics and its Applications, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC), Navi Mumbai, March 30- April 1, 2022.

Dutt Amit

- Awarded as one of the 75, ‘under 50’ scientists shaping today’s India.

Gaur Tarang

- Travel Grant and a Flash Talk: ‘A Novel Covalent CDK7 Inhibitor Potently Induces Apoptosis in Acute Myeloid Leukemia and Overcomes Resistance to Venetoclax’, EMBO workshop "Cancer cell signalling: molecular knowledge to cancer therapy", Cavtat, Croatia; September 16- 20, 2022.

George Akhila

- Best Oral Presentation Award: ‘Exploring Dietary phytochemical in regulating inflammasome pathway in oral cancer management’**,** VI International Conference on ‘Ayurved for Cancer’, Bharatiya Sanskriti Darshan Trust’s Integrated Cancer Treatment and Research Centre, Wagholi, Pune; December 9-11, 2022.

Ghogale Sitaram

- Runner-up Poster Presentation: ‘Role of LAIR1 (CD305) In Flow Cytometric Detection of Occult Bone marrow Involvement in Non-Cell B-Cell Non-Hodgkin Lymphoma’, 63rd Annual Conference of Indian Society of Hematology and Blood Transfusion, Kolkata; November 3-6, 2022.

Gota Vikram

- US Patent # 11,213,499 B1 dated 04/01/2022- Use of 3, 3’-Diselenodipropionic acid (DSEPA) as an anticancer agent.
- Best oral presentation award, 27th annual meeting of Asia-Pacific Blood and Marrow Transplantation Group (APBMT 2022), Kochi; October 6 – 9, 2022.

Gupta Sanjay

- Core Member of the Screening Committee of Life Sciences for SERB-SURE, DST, India.
- Member, Project Monitoring Committee for 'NSM Platform for Genomics and Drug Discovery' Centre for Development of Advanced Computing, A Scientific Society under the Ministry of Electronics and Information Technology, Government of India.

- Vice-Chairperson, Biobank Regulatory Committee, Sri Sathya Sai Sanjeevani Centre, Navi Mumbai.
- Member, Peer Review Committee, Chittaranjan National Cancer Institute (CNCI), Kolkata.

Gupta Saurabh

- Second Prize (E-Poster Presentation): 'Withaferin-A prevents the onset of acute Graft versus Host Disease by inhibiting JAK2-STAT3 signaling pathway', Virtual Conference at Global Cancer Consortium; March 19, 2022.
- Young Ethnopharmacologist Award (P K Debnath Memorial Award, Society For Ethnopharmacology [Sfe-India]): 'Withaferin-A prevents the onset of acute Graft versus Host Disease by inhibiting JAK2-STAT3 signaling pathway', 9th International Congress of the Society for Ethnopharmacology (SFEC-2022), Mysuru, Karnataka; April 22-24, 2022.
- Best Oral Presentation: 'Development of Withaferin-A against Graft versus Host Disease', 27th Annual Meeting of Asia-Pacific Blood and Marrow Transplantation Group (APBMT 2022), Kochi; October 6-9, 2022.

Ingle Arvind

- Chairman, Education and Training Committee, ICLAS, Brussels, Belgium.
- Chairman, Communication Standing Committee, IACLAM.
- President, Indian College of Laboratory Animal Medicine.
- Zonal Secretary (West Zone), IAVP.
- Ad-hoc Specialist (site visitor), AAALAC International, USA

Jha Anup

- First Prize in 'National Blog Writing Competition (Group-I category): 'Leveraging Science, Technology and Innovation for an Atmanirbhar Bharat' (VIGYANIKA, 8TH India

- International Science Festival 2022) Organized by Ministry of Science & Technology, Ministry of Earth Sciences, Department of Space, Department of Atomic Energy, Government of India and Government of Madhya Pradesh in Association with Vijnana Bharati (VIBHA), MANIT, Bhopal; January 22-23, 2023.

Joshi Asim

- First Runner-up for Translational Science Oral presentation: 'Efficacy of weekly Osimeritinib dosing over daily dosing: A Comparable Response using a mouse model for the ADAURA Clinical Trial', 8th National Annual Conference of ISMPOCON 2022; January 21 – 23 and 28 – 30, 2022.

Kadam Malini

- Second Position (International E-Poster Competition): 'Digital Nurse on Board: Eustress or Distress', Holy Spirit Institute of Nursing Education, Mumbai, September 20, 2022.

Kale Amish

- Rising Star Award, Global Power of Oncology Nursing (GPON), December 8, 2022.

Kandekar Shruti

- Best Poster Presentation Award**:** 'Mapping immune reconstitution and identifying immune markers on donor harvest for predicting GVHD incidence in transplant recipients post Allogeneic Hematopoietic Stem Cell Transplantation', 49th Annual Conference of Indian Immunology Society (IIS) IMMUNOCON-2022, Department of Translational & Regenerative Medicine and Immunopathology, PGIMER, Chandigarh November 23 -26, 2022.

Khadilkar Rohan

- National award: NASI – Platinum Jubilee Young Scientist Award – 2022.

Ketkar Madhura

- Best Amity Oral Presentation- (Young scientist): 'ER stress and GCN5 as novel molecular targets for GBM senotherapy',41st Annual Conference of the Indian Association for Cancer Research (IACR-2022), Amity Institute of Molecular Medicine and Stem Cell Research (AIMMSCR), Amity University, Uttar Pradesh, Noida; March 2 – 5, 2022.
- 'Dr. Harimohan Memorial Award' (best poster/flash presentation in Radiation Chemistry): 16th Trombay Symposium on Radiation & Photochemistry (TSRP-2022) **(Virtual)** in Indian Society for Radiation and Photochemical Sciences (ISRAPS), Bhabha Atomic Research Centre, Mumbai; January 12-15, 2022.

Khot Bhagyashree

- Third Prize (Oral Presentation): 'Frequency and impact on clinical outcome of Ph like ALL Abnormalities in Pediatric and Adult B-Acute lymphoblastic Leukemia', 9th Annual Conference of Molecular Pathology Association of India (MPAICON 2022), Narayani Heights, Ahmedabad ; August 6- 7, 2022.

Kode Jyoti

- US Patent # 11,213,499 B1 dated 04/01/2022- Use of 3, 3'-Diselenodipropionic acid (DSEPA) as an anticancer agent.
- Indian Patent Application # 202221018336 29th March 2022 - Standardized fruit rind extract of *Garcinia* exhibiting growth inhibition of triple-negative breast cancer in pre-clinical animal model.
- Indian Patent Application # 202221060383 dated 21st October, 2022 - Standardized *Garcinia* fruit juice (GI and GX) exhibit efficacy in immune competent mice model for treatment of acute graft-versus-host disease by regulating innate immune mechanisms post allogeneic hematopoietic stem cell transplantation.
- Indian Patent Application # 0144NF2022 dated 19th July, 2022 Anti-Cancer, Immunomodulatory Composition and Nanocellulose from Waste Root Biomass.

Kulkarni Pooja

- Second Prize (Best Oral presentation): 'Clinical and Prognostic Impact of IKZF1 deletions in Ph-positive B-Acute Lymphoblastic Leukemia (B-ALL)', 45th Annual Conference of Mumbai Hematology Group, Mumbai; March 12- 13, 2022.

Mehta Darshan

- Best Poster Award: *'Sfrp1 Regulates Cancer Stem Cells in Human Skin Squamous Cell Carcinoma Mediated through Non-Canonical Wnt Signaling'* , 1st HBNI Theme Meeting on Life Sciences, Raja Ramanna Centre for Advanced Technology, Indore; September 7-10, 2022.

Mishra Gauravi

- Funding award from the Indian Council of Medical Research (ICMR) and the Canadian Institutes of Health Research (CIHR) for project, Women Empowerment-Cancer Awareness Nexus (WE-CAN) Project (GACD project ID: CP02).
- Research paper selected for Funding Grant: 'Creating awareness and screening Mumbai Police for Common cancers and other Non-Communicable Diseases (NCDs)' to participate in virtual ICOH 2022 conference; February 2022.

Nagare Manasi

- Best Poster Award: 'Understanding immune landscape in Acute Myeloid Leukemia microenvironment: Role of NLRP3 pathway markers in dianostics and therapeutics', 48th Annual Conference of Indian Immunology Society, Infections, Vaccines & Immuno-Innovations for Human Health, Department of Molecular and Human Genetics, Banaras Hindu University, Varanasi; July 8 – 9, 2022 (Virtual Conference).

Parui Aasna

- Best Oral Presentation (Biochemical Journal Award): 'Inter-Subunit Crosstalk via PDZ synergistically governs allosteric activation of proapoptotic HTRA2', 44th Indian Biophysical Society meeting entitled Conceptual Advances in Biophysics and its Applications, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC), Navi Mumbai; March 30 - April 1, 2022.

Patil Jagruti

- Third Prize (Poster): 'Standardization of 25 colour CYTEK Northern Light flow cytometer and its utilization in comprehensive immunophenotyping of immune cell subsets', 14th Annual Conference-cum-Workshop, The Cytometry Society TCS-2022 Hyderabad; October 15-16, 2022.

Patil Subita

- Appointed as Secretary, ACT India, NGO, TMC.

Patkar Nikhil

- Wellcome Trust-DBT India Alliance Senior Fellowship (2022-Current). Competitive fellowship co-funded by the Wellcome Trust, UK and Department of Science and Biotechnology, Govt. of India for established researchers. Acute myeloid leukemia and the clonal dynamics of relapse. Funding: Rs 4.7crores, (~ USD 650,000).
- Invited co-author of the 5th edition of the WHO Classification of Tumours - Haematolymphoid Tumours by the International Agency for Research on Cancer, Lyon, France. Part of the Myeloid Subcommittee for Myelodysplastic Syndromes and Acute Myeloid Leukemia.
- Invited Participant of the Association for Molecular Pathology as part of the working group on Recommendations for Molecular MRD Monitoring in Acute Myeloid Leukemia (Joint Guidelines by College of American Pathologists, Association for Molecular Pathology and American Society of Hematology).
- Indian Council of Medical Research Subcommittee on Acute Lymphoblastic Leukemia: Consensus Document on Treatment of Acute Lymphoblastic Leukemia
- Dr. J. G. Parekh Oration Award for 2022-23, 46th Annual conference of Mumbai Hematology Group.

Pawar Shubham

- Third prize (Poster Presentation): 'Expression pattern of CD179 alpha in B-cell acute lymphoblastic leukemia (BALL): A potential utility for lineage assignment and BALL MRD monitoring', 14th Annual Conference-cum-Workshop, The Cytometry Society TCS-2022 Hyderabad; October 15-16, 2022.

Prabhin Denna

- Second runner- up (Oral): 'Clinical utility of CD177 in the diagnosis of myelodysplastic Syndrome', Haematocon 2022 ISHBT, Kolkata; November 3-6, 2022.

Sarin Rajiv

- Chairperson of the DBT Technical Evaluation Committee for Chronic Disease Biology and member of the apex DBT STAG committee. Chaired several meetings in 2022

- Chairperson, DST SERB Biomedical & Health Science Committee. Conducted two meetings in 2022 and reviewed ~800 projects for competitive funding
- Chairperson of the Expert group for CSIR Mission titled IndiGenMed in 2022
- Subject Expert Committee member of DCGI Committee for Cell Based Therapy.
- Co-Chairperson of ICMR committee for Umblical Cord Blood Banking Guidelines

Sarkar Debashmita

- Best Poster Award : *'GCN5 as a master regulator of DNA Double Strand Break Repair mediates GBM radio resistance',* 5th Asian Congress of Radiation Research (ACRR) & 3rd Biennial Meeting of Society for Radiation Research (SRR), DAE Convention Centre, Anushaktinagar, Mumbai; November 17-20, 2022.

Sharma Dipti

- Best Oral Presentation Award: 'Oncogenic Role of TCTP in Radioresistance and Poor Outcome in Oral Cancers', 5th Asian Congress of Radiation Research (ACRR) & 3rd Biennial Meeting of Society for Radiation Research (SRR), DAE Convention Centre, Anushaktinagar, Mumbai; November 17-20, 2022.

Sharma Sagarika

- Best Poster Award: 'Utility of combination of anti-CD10, anti-CXCR5, and anti-ICOS antibodies in the diagnosis/staging of follicular-Helper T-cell Lymphoma/Angio immunoblastic T cell lymphoma', ESCCA 2022, Belfast, Northern Ireland UK; September 21-24, 2022.

Shetty Dhanlaxmi

- Awarded the Long Term ICMR-DHR international Fellowship for Young Indian Bio-medical Scientists 2022-23.

Singh Bhawna

- Best Oral Presentation Award: 'BCCIP mediated replication stress in glioma stem cells drives their radiation resistance', 5th Asian Congress of Radiation Research (ACRR) & 3rd Biennial Meeting of Society for Radiation Research (SRR), DAE Convention Centre, Anushaktinagar, Mumbai; November 17-20, 2022.

Sudharshan Mukund

- Poster Award (IUPAB – R.R. Gopal Ayengar Memorial Award): 'Multiple states of urea induced gankyrin unfolding captured by time resolved crystallography', 44th Indian Biophysical Society meeting entitled Conceptual Advances in Biophysics and its Applications, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC), Navi Mumbai; March 30 - April 1, 2022.

Tembhare Prashant

- Best Oral Award: 'Clinical relevance of immunophenotypic signature of myeloblasts and proportions of hematogones and monocytes in Juvenile Myelomonocytic Leukemia', ESCCA 2022 Conference, Belfast, Northern Ireland UK; September 21-24, 2022.

Talele Vedika

- Third Prize (Oral): 'Flow cytometric detection of mutant NPM1 and its utility in rapid diagnosis of acute myeloid leukemia with NPM1 mutation', 14th Annual Conference-cum-Workshop, The Cytometry Society TCS-2022 Hyderabad; October 15-16, 2022.

Thorat Rahul

- Treasurer**,** Laboratory Animal Scientists Association of India (LASA).
- Ad-hoc Specialist (site visitor), AAALAC International, USA.

Waghmare Sanjeev

- Institutional Biosafety Committee, BARC, Mumbai.
- Institutional Committee for Stem Cell Research, NIRRH, Parel, Mumbai.
- Institutional Committee for Stem Cell Research, Himedia, Mumbai.

Yadav Neelima

- Best Amity Oral Presentation- (Young scientist): 'Progesterone Modulates DSCAM-AS1/miR-130a/ER axis to suppress invasion and migration of breast cancer cells', 41st Annual Conference of the Indian Association for Cancer Research (IACR-2022), Amity Institute of Molecular Medicine and Stem Cell Research (AIMMSCR), Amity University, Uttar Pradesh, Noida; March 2 – 5, 2022.

ACTREC Publications

International

1. Abraham G, Noronha V, Rajappa S, Agarwal A, Batra U, Somani N, Raja T, Patil S, Kaushal AM, Joshi A, Radhakrishnan V, Singh N, Babu K G, Tewani R, Baghmar S, Dodagoudar C, Ananthakrishnan R, H P S, Sharma V, Menon N, Patil V, Joshi A, Gupta S, Prabhash K, Bajpai J (2022). The clinical utility and safety of Short-course Immune check point inhibitors (ICI) in multiple tumors - A real world multicentric study from India. International Journal of Cancer. 150(6):1045-1052. PMID: 34751432.
2. Achrekar MS. (2022).Enhanced recovery after surgery (ERAS) nursing program. Asia-Pacific Journal of Oncology Nursing. 9(7):100041.PMID: 35620398
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5. Ashar S, Lipsa A, Khan N, Sarin R (2022). High cumulative risk of colorectal cancers and desmoid tumours and fibromatosis in South Asian APC mutation carriers. Journal of Medical Genetics. 59(5):492-495. PMID: 33766935
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9. Bal M, Sharma A, Rane SU, Mittal N, Chaukar D, Prabhash K, Patil A (2022). Neuroendocrine Neoplasms of the Larynx: A Clinicopathologic Analysis of 27 Neuroendocrine Tumors and Neuroendocrine Carcinomas. Head and Neck Pathology. 16(2):375-387. PMID: 34401980.
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Spectroscopy, attenuated total reflection-fourier transform infrared spectroscopy, and mass spectrometry of serum samples. Analytical Chemistry. 94(34):11898-11907.

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