



ACTREC OPEN DAY

4th & 5th December, 2025



The Cancer Research Institute (CRI) began its tradition of welcoming students into the world of cancer science with its first 'Open Day' in 1995, when it was based at the Tata Memorial Centre's Parel campus. What started as an effort to introduce young science enthusiasts to real-time research soon grew into an annual event that continues with the same enthusiasm even today. When CRI moved to ACTREC's new campus in Kharghar in 2002, the tradition moved along seamlessly. Since 2005, the Clinical Research Centre (CRC) has also joined this initiative, adding its own expertise and interactive demonstrations. Even the pandemic could not interrupt the spirit of Open Day—only the format changed, shifting temporarily to virtual sessions.

This year, ACTREC will host its Open Day on 4th and 5th December 2025. Over two days and four half-day sessions, nearly 600 students and faculty members from science, pharmacy, medical, and allied colleges across Mumbai and Navi Mumbai will explore the Centre. Each session will begin with a vibrant poster display highlighting major aspects of cancer biology, diagnostics, therapeutic approaches, and preventive strategies. This will be followed by an introductory talk that offers an overview of ACTREC's research endeavours, clinical strengths, and academic landscape.

The most exciting part—the laboratory visits—will follow. Students, in small guided groups of about 15, will be taken by volunteers to different demonstration laboratories. Each lab will showcase a key technological platform that drives research or clinical programs at ACTREC. Visitors will get a chance to witness cutting-edge experiments, understand the science behind ongoing projects, and interact directly with scientists, clinicians, and research scholars who bring this work to life.

Demonstrations for OD25

No.	Demo Labs	Title of Demonstration
1	Lab Animal Facility	Laboratory Animal Models for Cancer Research
2	Small Animal Imaging Facility	Comparative Oncology Program and Translational Preclinical Imaging and Radiotherapy Facility
3	Academics (ACTREC students)	Academics @ ACTREC by Students Council of ACTREC
4	Varma Lab (KS)	Protein Biochemistry and Crystallization
5	Electron Microscopy (KS)	Electron Microscope Facility
6	Mass Spectrometry (KS)	Mass Spectrometry Facility
7	CAR T Cell (KS)	The cGMP CAR-T & Cell Therapy Centre
8	Patwardhan Lab (KS)	Patwardhan Laboratory
9	Computational Biology & Cross Talk Lab (Archival)	Chandrani Laboratory
10	Digital & Computational Oncology (KS)	Digital and Computational Oncology

Demo: Laboratory Animal Models for Cancer Research

Dr. Arvind Ingle, Officer-in-Charge, Laboratory Animal Facility, ACTREC

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ACTREC has Laboratory Animal Facility (LAF) to breed, maintain and supply quality rodents for its basic cancer research programs. Available animals encompass 10 basic strains of mice, 1 hybrid strain (B6D2F1) of mice, 10 transgenic mice, 11 knockout mice, and 29 crosses of Tg and knockout mice, one each Nude and SCID mice strains; 1 strain of rat; and 1 strain of hamster, majority of which are inbred [<https://actrec.gov.in/index.php/cri-research-support-facility-detail/70>]. Standard operating procedures are followed for all the activities of LAF, and stringent programs are in place for genetic monitoring, clinico-pathology, and assessment of microbiological status of laboratory rodents, animal feed, water and room air. An embryo freezing program has been introduced for the animal strains maintained at ACTREC. LAF offers quality control services to outside facilities and provides surplus animal strains to the CCSEA-registered animal facilities in India. The facility is an “Institutional Member” and recognized “Training and Education Center” of the International Council for Laboratory Animal Science (ICLAS), Brussels, Belgium. Since 2005, LAF has organized ten workshops, two certificate courses and two international conferences for laboratory animal professionals in the country. It also accepts M.Sc./ M.V.Sc./ MTech students as dissertation trainees under its on-going quality control program. The LAF demonstration during Open Day 2025 will introduce some of the representative animal models maintained in the Laboratory Animal Facility of ACTREC, their characteristics, and usage for the biomedical/ cancer research. The demonstrators will also detail the numbering system, environment, food and water requirements, and housing enclosure conditions for different animal models.

Demo: Comparative Oncology Program and Translational Preclinical Imaging and Radiotherapy Facility

Dr. Pradip Chaudhari, Scientific Officer H, CRI, ACTREC

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Preclinical research is the backbone of modern medicine and new drug discoveries. The use of small-animal models in basic and preclinical sciences is a major keystone for these kinds of research and development strategies, representing a bridge between discoveries at the molecular level and clinical implementation in diagnostics and/or therapeutics. The high-resolution in vivo imaging technologies provide a unique opportunity for studying diseases in real-time, validating animal models, quantitation of organ function and molecular pathways non-invasively. ACTREC has got state-of-art imaging facility having microPET (positron emission tomography [PET] and microSPECT (single photon emission computed tomography) and microCT (Computed Tomography). Each modality has intrinsic advantages and limitations. The focus of the facility is on preclinical animal imaging and radiopharmaceuticals research. Diagnostic radionuclides such as technetium-99m and fluorine-18 complexes are being evaluated for their utility in imaging and monitoring cancer in various mouse xenograft and orthotopic models. The theragnostic radionuclide such as Lu-177 is utilized for labelling complexes targeting cancer in mouse models.

The x-ray irradiator is used for delivering radiation therapy in cancer models in rat and mouse. The irradiation of human cancer cell line is performed for radiation biology research and developing mouse models. These studies are useful for designing new treatment protocols and radiation biology studies.

In the arena of the Comparative Oncology Program - Animal Cancer Care Centre (Kukkuripa) provides diagnosis and treatment of pet animals suffering from spontaneous cancer. Also, it examines comparative aspects of animal and human cancers. The animal cancer biorepository maintains biological specimens such as blood, fresh-frozen or formalin-fixed or formalin-fixed paraffin-embedded tissues collected during diagnosis/ treatment, and uses it for comparative oncology research.

Demo: Academics @ ACTREC

Students Council of ACTREC

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On the occasion of ACTREC's Open Day, the Students' Council of ACTREC (SCA) will conduct an informal, interactive session for visiting undergraduate and postgraduate students interested in research and academia. The session will provide a student-centered perspective on cancer research at ACTREC and guide students through academic pathways, entrance exams, essential skills, and long-term career planning.

Career Pathways and Exams: After graduation (BSc/BTech), students will learn about pursuing Master's degrees at reputed universities and preparing for exams such as IIT-JAM, the JNU entrance exam, and institute-specific MSc/MTech tests. Guidance will also be available for those exploring MBA or other career options. After post-graduation (MSc/MTech), the session will explain key PhD

entrance exams including JGEEBILS, CSIR-UGC NET, DBT-JRF, ICMR-JRF, BARC-DAE, TIFR GS, and GATE. Students will learn about exam formats, interview processes, PhD selection criteria, and opportunities for PhD programs abroad. NET/SET pathways for teaching careers will also be covered.

How Students Should Prepare: Students will be encouraged to build strong subject knowledge through regular MCQs and trusted textbooks such as Lehninger, Alberts, Primrose, and Friefelder. They will learn the importance of reading research papers, starting with reviews and gradually moving to original studies. Participation in seminars, workshops, conferences, and poster presentations will be recommended. The session will emphasize critical thinking, understanding the purpose of experiments, and interpreting scientific data logically.

Long-Term Career Planning: Students will be advised to start planning early so they can smoothly clear entrance exams and enter PhD programs without long gaps. Early preparation supports timely completion of doctoral studies, a better transition to postdoctoral research, and eligibility for faculty positions. At least six months of wet-lab experience before a PhD is recommended.

Understanding the PhD Journey and Beyond: The session will explain that a PhD requires dedication, scientific aptitude, and several years of independent research. Career opportunities after a PhD include postdoctoral positions in India and abroad, academic faculty tracks, and research and development roles in the pharmaceutical and biotechnology industries.

Open Q&A: The session will conclude with an interactive question-and-answer segment for students to discuss exams, research careers, preparation strategies, and life in academia

Demo: Protein Biochemistry and crystallization

Dr. Ashok Varma, Principal Investigator and Scientific Officer “H”, ACTREC

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With the help of two-dimensional gel -electrophoresis and x-ray Crystallography methods, we can visualize the protein molecules. Two-dimensional gel -electrophoresis help us the visualize the compact form of protein whereas x-ray Crystallography help the scientist to determine precise position of each atoms and molecules present in three-dimensional environment. The Varma lab works on genomics, proteomics, structure biology and bioinformatics. During the student visit of the day of open day, student will explore the opportunities to visualize the protein molecules.

Demo: Electron Microscope Facility

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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

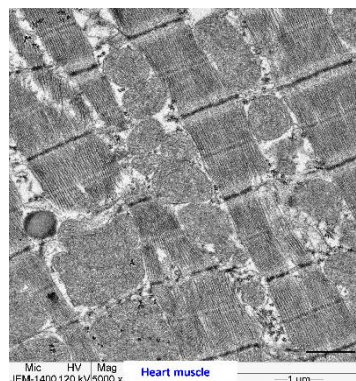
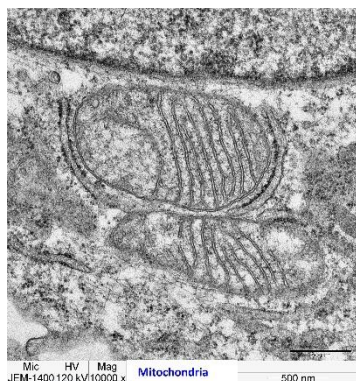
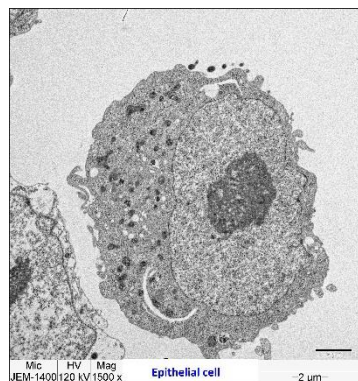
0.2nm resolution. The facility provides services for research and analysis of biological samples, nanoparticles and other applications.

Electron Microscopy: Electron microscopy is a powerful imaging technique that uses a beam of electrons to create an image of the specimen. It offers much higher resolution than light microscopy and thus allows to observe minute details at the nanometer scale.

Electron Microscopy in Cancer Research: Electron microscopy is essential in cancer research for its ability to visualize cellular and subcellular structures in great detail. It helps to study the morphology of cancer cells and identify the abnormalities in cell organelles. This information is crucial for understanding the mechanisms of cancer development and progression. It has revealed unique structural features of cancer cells, such as changes in nuclear architecture, distortion in mitochondrial structure, and alterations in the cytoskeleton. These structural differences are not only diagnostic markers but also provide insights into the altered cellular functions that drive cancer progression.

Demonstration: The students will be demonstrated - image acquisition on JEOL JEM 1400 PLUS transmission electron microscope at 120kV and ultra-thin sectioning using the ultra-microtome.

<https://actrec.gov.in/electron-microscopy>



Demo: Mass Spectrometry Facility, ACTREC

Mr. Shashi Dolas, Mass Spectrometry, ACTREC-TMC

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The Mass Spectrometry facility at ACTREC houses four state-of-the-art mass spectrometry platforms connected to high performance liquid chromatography systems – (1) Orbitrap Exploris 480, Thermo, (2) ESI/MALDI Q-TOF Model Synapt XS (3) Triple Quadrupole Model Xevo TQ Absolute and (4) The Nano-LC (ABSCIEX, Eksigent)-ESI-Q-TOF Model Triple TOF 5600 plus SCIEX.

Mass spectrometry is a technique which measures mass-to-charge ratios of ions. This can be used to identify and quantify the molecules of interest in the given sample. Since the advent of soft ionization methods, large biomolecules like proteins are increasingly being analyzed by mass spectrometry for studying various aspects of their structure. Mass spectrometry based Proteomics,

i.e., large scale identification and quantification of proteins from a complex mixture of biological origin; and variations thereof, has become an important workflow in biological research. High resolution mass spectrometry is primarily applied for large scale discovery studies while low resolution mass spectrometry is more suited for targeted proteomics. At ACTREC, we have three high resolution mass spectrometers (MS) and one low resolution MS dedicated for omics applications.

Demo: The cGMP CAR-T & Cell Therapy Center

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The cGMP CAR-T & Cell Therapy Center at ACTREC–TMC is a state-of-the-art clinical manufacturing facility dedicated to developing and producing advanced cellular immunotherapies under stringent Good Manufacturing Practices (GMP). The center is designed to support end-to-end workflows for clinical-grade immune-cell engineering, including cell isolation, activation, gene modification, expansion, formulation, and release testing.

Equipped with ISO-classified cleanrooms, closed automated bioprocessing systems, validated equipment, and advanced QC units, the facility enables the safe, compliant, and reproducible manufacturing of Cellular & Gene therapy products for early-phase clinical trials.

Demo: Patwardhan Laboratory

Dr. Sejal Patwardhan, Scientific Officer 'E' & Principal Investigator, Patwardhan Laboratory, CRI-ACTREC

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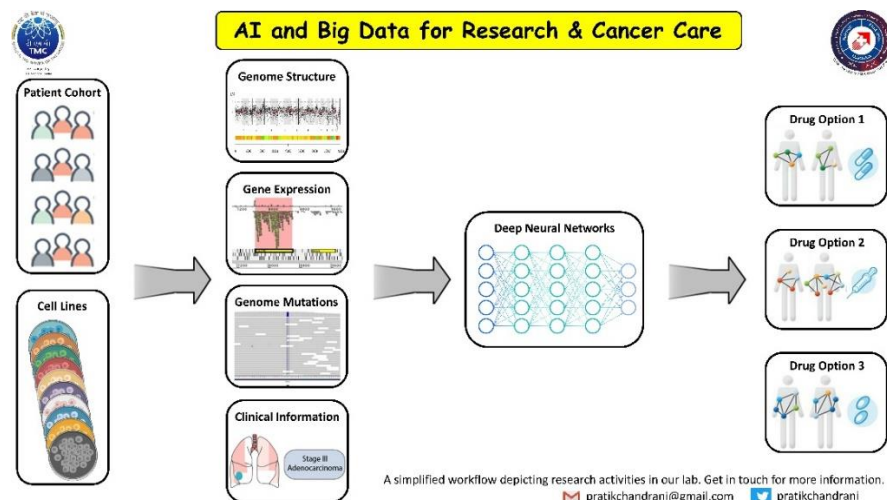
Breast cancer is the most lethal type of cancer in women. Over the past few decades, many inventions have been made in treatment modalities. Still, the disease aggressiveness and disease relapse are the daunting topics in the healthcare community. There are various tumor-associated biochemical and biophysical parameters that restrict outcomes of treatment. At Patwardhan Laboratory, we aim to understand breast cancer progression by elucidating the mechanistic roots responsible for this biochemical signalling crosstalk, such as metastasis, invasion, bystander effects and biophysical cues like ECM stiffness-tuned mechano-transduction, which fuel disease progression and induce therapy resistance. To unleash the molecular players and their plausible mechanisms responsible for disease progression, we have established an *in vitro* and *in vivo* breast cancer model to recapitulate the clinical scenario. Along with the conventional approach, we integrated a bioinformatics arm in our research toolkit, which comprises proteomics, genomics and metabolomics, along with cellular biophysics to strengthen the research findings. Interestingly, one of the molecular players, THBS-1, that emerged from our basic research, is being tested clinically in patient samples to illuminate its potential to be a prognostic/predictive or a therapeutic marker for breast cancer, indeed supporting the saying of the scientific fraternity - "Bench-to-Bedside".

Demo: Chandrani Laboratory

Dr. Pratik Chandrani, Principal Investigator, Chandrani Laboratory, CRI-ACTREC

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Given the perplexing diversity of cancer, investigation of an effective therapeutic solution is a daunting task. Chandrani lab focuses on utilising advanced technologies to identify therapeutic targets in cancer. We use genomics, computational modelling, artificial intelligence, and other advanced methodologies to identify novel therapeutic targets. Furthermore, we validate novel targets using model systems (cell lines, animal models, etc.). We also actively contribute to clinical translation of findings through Molecular Tumor Board (MTB clinics) and forums at Tata Memorial Centre.



Demo: Digital and Computational Oncology

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The Department of Digital and Computational Oncology marks a shift in the Academic Hospital setups in India, from being just the end users of healthcare technology to becoming the drivers and enablers of AI/ML adoption and creation of unique AI/ML pipelines in Healthcare. To support this transition, we have built a robust, independent infrastructure anchored by our "Bioinfinix" High-Performance Computing cluster and advanced GPU. This on-premise capability allows us to process massive genomic and imaging datasets securely, fueling research initiatives like the creation of the Cancer Imaging Biobank. By developing proprietary AI models for tumor microenvironment characterization and deploying custom Large Language Models for clinical data mining, we are ensuring that high-level computational research translates directly into advanced patient care tools.



Advanced Centre for Treatment, Research and Education in Cancer (ACTREC)

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[Google Map](#)