DRILS ANNUAL REPORT

2023-2025

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Mission and Vision

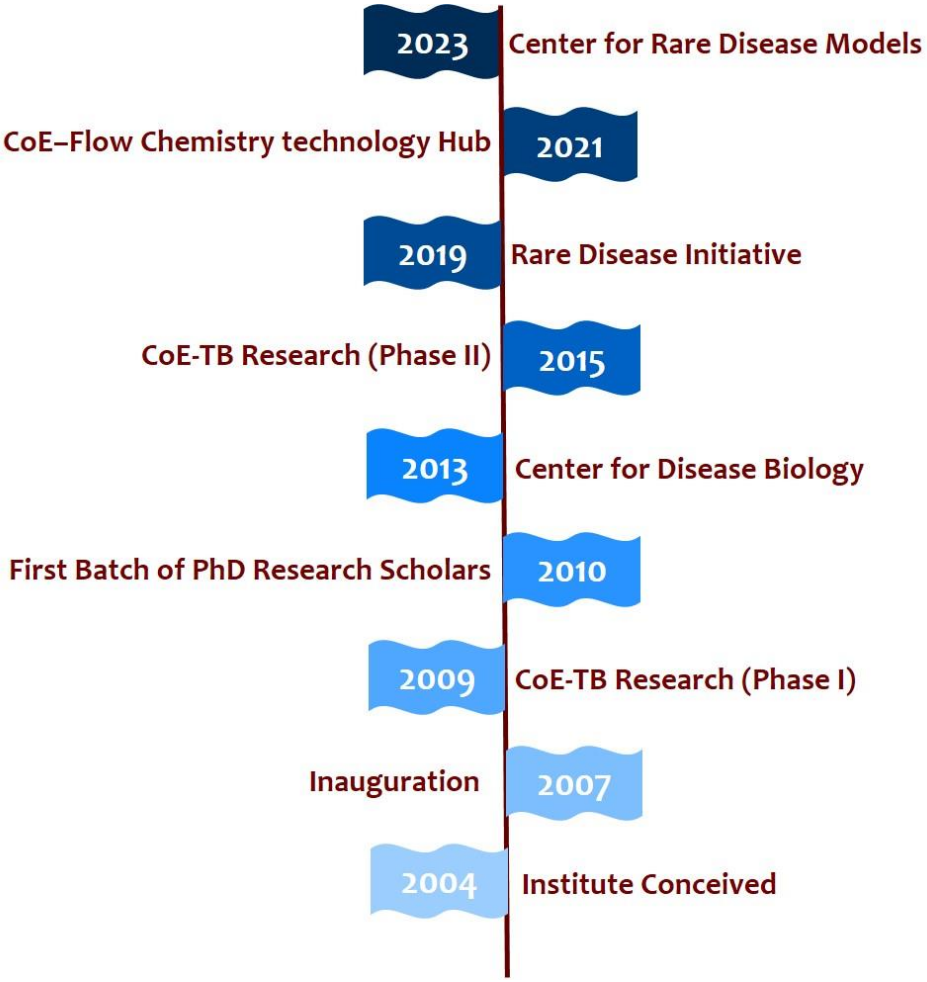
Dr. Reddy's Institute of Life Sciences (DRILS) is a not for profit Research Institute with a mission to be the preferred research partner to the pharma and life sciences industry. DRILS focuses on original research and advancement of relevant skills, with emphasis on solution-oriented interdisciplinary research for solving unmet needs and for process innovation. The Institute has been set up on a public-private partnership model by Dr. Reddy's Laboratories, the Government of Telangana, and the University of Hyderabad, and is governed by a Board of Directors comprising eminent scientists and visionaries.

The vision of our Founder Chairman, Padmabhushan Dr. Kallam Anji Reddy, can be eloquently summarized in his own words:

"*If the world's burden of disease is to be diminished, it needs science that is both good and cost-effective. India has the potential to deliver on science that is both. I have great confidence in our army of chemists and biologists. And I firmly believe that walking on the trail of innovation will lead to creating a great company - a company that doctors, patients, investor and the public will admire*."

DRILS as a research center became operational in 2007. Since then, it has provided a vibrant platform to several scientists from industry and academic backgrounds in their pursuit of advanced knowledge and relevant skills. Dr. Reddy's Institute of Life Sciences has emerged as a unique non-governmental research institute, with a passion for science and learning and a purpose to catalyse innovative and sustainable research with societal benefit and indigenous innovation.

HISTORICAL MILESTONES



FROM THE DIRECTOR'S DESK

With a purpose to create capabilities in science and technology and find solutions to challenging problems in the chemical and life sciences, Dr. Reddy's Institute of Life Sciences is a unique ecosystem that facilitates design and development of products and technologies that add value to areas such as pharmaceuticals, biotechnology, and advanced materials. Driven by genuine passion for science and learning, and catalyzing innovative and sustainable research, we have consistently worked to build bridges with industry and be a preferred research partner. This report provides an updated overview of Institute's activities and focus areas.

Both industry-relevant and fundamental research at DRILS has progressed steadily and continues to receive recognition, including the CII Industry-Academia Partnership Award, philanthropic funding support for the Center for Rare Disease Models (CRDM), and extramural grant funding including the Collaborative Clinical Research Center grant from DBT/Wellcome Trust India Alliance. This funding has been crucial for the Rare Disease research initiative at DRILS enabling us to acquire state-of-the-art equipment and facilities for model generation, molecular and phenotypic characterization, and repository establishment. We are pioneering the use of Zebrafish Models and CRISPR-based technologies to accelerate drug discovery for rare genetic disorders in India.

The recently established Computational Biology Laboratory integrates advanced computing and AI/ML approaches in disease biology programs and drug discovery research. Our strengths in Process R&D and Medicinal Chemistry has resulted in efficient and sustainable chemical processes that provide value to our industry collaborators. Our Flow Chemistry Technology Hub (FCT-Hub) plays a pivotal role in enabling batch-to-flow translation, promoting eco-friendly and scalable continuous manufacturing.

Our research aimed at developing the next generation of gene therapies primarily focusing on mRNA and AAV-based strategies, have begun to yield results in terms of publications and patents. These represent potential areas for industry contribution in addition to ongoing projects in Medicinal and Process Chemistry and Molecular Immunology.

Our work thus provides truly interdisciplinary capability that encompasses Nanotechnology, Molecular Biology, and Computational Platforms, ensuring DRILS remains a vital partner for industries focused on innovation, sustainability, and addressing critical unmet medical needs

Looking ahead, we will continue to engage with our partners Dr. Reddy's Laboratories, the Government of Telangana, and the University of Hyderabad, seeking new partnerships for the successful translation of our R&D efforts.

Srinivas Oruganti

Director, DRILS, Hyderabad

BOARD OF DIRECTORS

NAME	DESIGNATION
Mr. G.V. Prasad, Chairman of the Board	Co-Chairman & Managing Director, Dr. Reddy's Laboratories Ltd.
Mr. Satish Kallam Reddy	Chairman, Dr. Reddy's Laboratories Ltd.
Ms. Mahima Datla	Managing Director, Biological E Ltd.
Prof. Basuthkar Jagadeeshwar Rao, *Ex-officio*	Vice Chancellor, University of Hyderabad.
Shakthi Nagappan *Ex-officio*	Nominee of Principal Secretary, Dept. of Industries and Commerce, Govt. of Telangana.
Dr. Srinivas Oruganti	Whole time Director, DRILS
Prof. Seyed E. Hasnain	National Science Chair, IIT-Delhi, Distinguished Professor, Sharada University and Former Vice Chancellor, University of Hyderabad.
Prof. Yamuna Krishnan	Professor, University of Chicago
Prof. Madan Pillutla	Dean & Professor, Indian School of Business.
Mr. Murali Ramachandra	CEO, Aurigene Oncology Limited.

CENTERS

Research at DRILS is supported by external funds such as government grants or industry-sponsored grants, or internal funds for high priority areas. DRILS is organized into three centers:

1. Center for Innovation in Molecular and Pharmaceutical Sciences (CIMPS)
2. Center for Process Research Innovation (CPRI)
3. Center for Advancement of Research Skills (CARS).

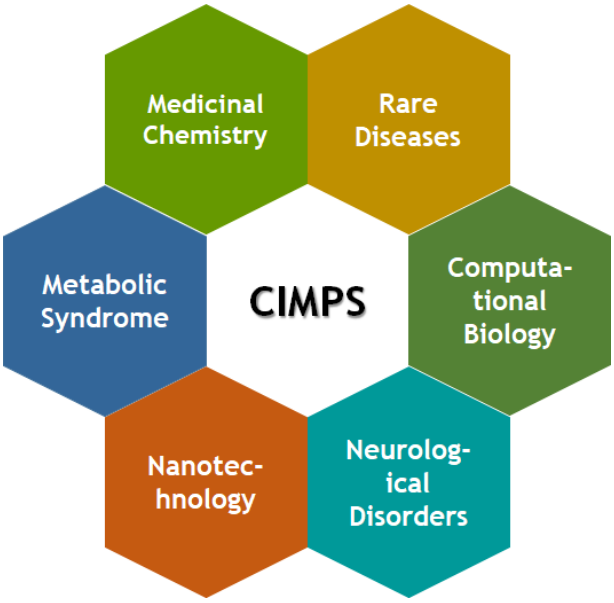
CIMPS CIMPS represents the Institute's core research activity, and comprises scientists with diverse technical backgrounds spanning advanced molecular biology, cell biology, pharmacology, organic and medicinal chemistry and nanochemistry.

CARS CARS focuses on training programs to advance the skills and aptitude in basic science and industry-relevant areas, among students, teachers and industry recruits. Scientists at DRILS are also actively engaged in mentoring Masters and Ph.D students and post-doctoral fellows supported by government fellowships and research grants.

CPRI CPRI is the Institute’s chemistry vertical engaged in addressing the industry’s chemical research and innovation needs, with the main thrust areas being process R&D and medicinal chemistry.

Center for Innovation in Molecular and Pharmaceutical Sciences

The Center for Innovation in Molecular and Pharmaceutical Science (CIMPS) represents the institute's core research activity. Scientists at CIMPS have diverse technical backgrounds, spanning advanced molecular biology, cell biology, pharmacology, organic and medicinal chemistry, computational biology, neurology and nano chemistry. Research at CIMPS is supported by external funds such as government grants or industry-sponsored grants, or via internal funds for high priority areas. Ph.D. Students and post-doctoral fellows with government fellowships work on government-funded research projects.



Investigators:

Parimal Misra
Chief Scientist

Manojit Pal
Chief Scientist

Kiranam Chatti
Senior Principal Research Scientist-II, HOD (CARS)

Kishore Parsa
Senior Principal Research Scientist-II, HOD (CIMPS)

Aarti Sevilimedu
Senior Principal Research Scientist-I

Marina Rajadurai
Senior Research Scientist

Sandipan Chakraborty
Principal Research Scientist

Neelima Dubey
Associate Principal Research Scientist

Tandrika Chattopadhyay
Associate Principal Research Scientist

PARIMAL MISRA

Chief Scientist

Our group works on metabolic disorders. Transcriptional coactivators play a crucial role in regulating gene expression. PRIP Interacting protein with Methyl Transferase domain (PIMT)/ Trimethyl guanosine synthase 1 (TGS1) is a co-activator interacting protein with an RNA methyl transferase domain. PIMT serves as a bridge between HAT and non-HAT coactivators and differentially modulates gene expression. Disruption of PIMT is embryonic lethal. PIMT regulates hepatic gluconeogenesis and TNF-α induced insulin resistance in the skeletal muscle. As a methyl transferase, PIMT controls HIV-1 post transcriptional regulation and is essential for human telomerase RNA biogenesis. To provide a comprehensive understanding of the dual role of PIMT, which promises to be a potential target in the treatment of several metabolic disorders, our group is working to understand its function in other important metabolic tissues like pancreas, adipose and macrophages using different knock down animal models and normal and diseased human tissues.

- *Deepesh Biswas , Rebecca Kristina Edwin , K. Shiva Kuma , Anwar Alam , Dhiraj Kumar , Sandipan Chakraborty , Gopalakrishnan Bulusu , Farhan Jalees Ahmad , Gautham G. Shenoy , Lakshyaveer Singh , Mansi Agarwal , Fouzia Siraj , Srinivas Oruganti , Parimal Misra , Nasreen Zafar Ehtesham , Manojit Pal* , Seyed Ehtesham Hasnain*. Early preclinical development of Mycobacterium tuberculosis amino acid biosynthesis pathway inhibitor DRILS-1398 as a potential anti-TB drug. iScience, 2025 (accepted)*

MANOJIT PAL

Chief Scientist

My group mainly focuses on the development of new chemical entities under the drug discovery programme in therapeutic areas namely tuberculosis, inflammation, obesity, psoriasis and cancer. The group contributed in identification of a small molecule as inhibitor of chorismate mutase that showed POC in animals and could be effective against tuberculosis (WO 2020/240272 A1). The molecule was found to be effective against MDR-Mtb ATCC 35825 as well as Staphylococcus aureus. This group also identified a selective 5HT2C agonist (PAAM) towards the potential management of obesity (WO/2021/028935). In another project the group identified a lead molecule as a selective inhibitor of 12R-LOX with anti-psoriatic effects in animal (WO 2020/255156 A1) for which the patent is granted in India. The group is also involved in the identification of selective and potent inhibitors of PDE4 for the potential treatment of inflammatory diseases. The other major areas of focus include transition metal / non-metal catalysed reactions, sonochemical approaches, green chemistry, heterocycle synthesis etc (see: Research.com:https://research.com/u/manojit-pal).

- *Dandela et al. Organic Chemistry-Biology Interface research activities in India, Bioorganic Chemistry 2024, 108031, https://doi.org/10.1016/j.bioorg.2024.108031*
- *Bhuktar et al, Targeting next-generation PDE4 inhibitors in search of potential management of rheumatoid arthritis and psoriasis, Bioorganic Chemistry, 2024, 107689, https://doi.org/10.1016/j.bioorg.2024.107689*
- *Reddy et al. Recent advances in transition metal-catalyzed reactions of chloroquinoxalines: applications in bioorganic chemistry. Bioorg. Chem. 2022, 29, 106195; https://doi.org/10.1016/j.bioorg.2022.106195*

KISHORE PARSA

Senior Principal Research Scientist, HOD (CIMPS)-II

Immune responses/inflammation and metabolism are deeply integrated and tightly regulated processes required for the organismal survival. Coordination between nutrient and pathogen/inflammatory stress sensing mechanisms is required for efficient handling of energy resources. In pursuit of the understanding of the interface between inflammation and metabolism, my laboratory is keenly interested in unravelling the intracellular signaling mechanisms that regulate macrophage inflammatory responses and probe the significance of these signaling networks in metabolic syndrome. Towards this, my group utilizes a combination of cellular, molecular biological and genomics approaches in an attempt to identify signaling hubs that harmonize inflammatory and metabolic processes. In the past year, we along with Dr. Chatti and Dr. Thondamal's laboratories, used cultured cells, PHLPP1-ablated *C. elegans* and PHLPP1 knockout zebrafish as model systems and uncovered the functional significance of Ser/Thr Phosphatase, PHLPP1, in the control of lipid metabolism and the development of foamy macrophages-early lesions of atherosclerosis. In addition, we also collaborated with AIG hospitals, Hyderabad and contributed to the determination of the efficacy of Roche anti-COVID-19 monoclonal antibody therapy against Delta and Kappa variants and identification of a variant of TMPRSS2 protease, which is associated with lesser disease severity.

- *Edwin, Rebecca Kristina, et al. "TGS1/PIMT knockdown reduces lipid accumulation in adipocytes, limits body weight gain and promotes insulin sensitivity in mice." Biochimica et Biophysica Acta (BBA)-Molecular Basis of Disease 1870.1 (2024): 166896.*
- *Galande, Sheethal, et al. "Modulation of nuclear receptor 4A1 expression improves insulin secretion in a mouse model of chronic pancreatitis." Pancreas (2024): 10-1097.*
- *Bhuktar, Harshavardhan, et al. "Targeting next-generation PDE4 inhibitors in search of potential management of rheumatoid arthritis and psoriasis." Bioorganic Chemistry 151 (2024): 107689.*

KIRANAM CHATTI

Senior Principal Research Scientist-II

Zebrafish are alternative animal models useful in vertebrate developmental biology, disease biology, toxicology, and pharmacology. We apply CRISPR-based genome engineering in zebrafish to explore tyrosine kinase biology in vivo. Our goal is to generate disease models with tyrosine kinase dysregulation, primarily cancer. We collaborate extensively with other groups in the Institute to contribute to projects where zebrafish is useful, including rare diseases. We have generated c-MET knockout zebrafish and are in the process of reporting this data. In collaboration with Dr. Aarti Sevilimedu, we are generating zebrafish knockouts of selected rare disease genes. In collaboration with Dr. Kishore Parsa's group, we have generated PHLPP1-knockout zebrafish and this work has been published recently. The application of strategies for generating genomic knock-ins and mutations is an ongoing effort.

- Hilal Ahmad Reshi 1, Raghavender Medishetti 2, Aishwarya Ahuja 3, Deepa Balasubramanian 4, Kavita Babu 3, Manish Jaiswal 4, Kiranam Chatti 2, Subbareddy Maddika (2024). EYA protein complex is required for Wntless retrograde trafficking from endosomes to Golgi. Developmental Cell, 59(18):2443-2459.e7. doi: 10.1016/j.devcel.2024.05.021.
- Varshini Uma Jayaraman, Raghavender Medishetti, Shreetama Ghosh, Kiranam Chatti, Mahesh Kumar Uppada, Srinivas Oruganti (2025). Leveraging transfer learning for high-accuracy phenotypic screening in zebrafish image analysis. bioRxiv preprint doi: https://doi.org/10.1101/2025.01.21.634041
- Swathi C, Payal Chaubey, Sunny Khandelwal, Raghavender Medishetti, Sushreeta Chakraborty, Shruthi Raja ram, Kavya Jayakumar, Pikaso Latua, Rythem Goyal, R Gopalakrishna, Sougat Das, Kiranam Chatti, Kalyane swar Mandal, Aneesh Tazhe Veetil (2025). GPCR-targeted imaging and manipulation of homeostatic microglia in living systems. bioRxiv preprint doi: https://doi.org/10.1101/2025.04.01.646501

AARTI SEVILIMEDU

Senior Principal Research Scientist-I

Our group works on two broad thematic areas. As part of the first, we are interested understanding the contribution of RNA to the regulation of gene expression. This includes the role of noncoding RNA molecules as well as RNA motifs and elements in coding RNA that directly or indirectly impact transcription and translation. The second area of interest of our group is the biology of rare diseases using zebrafish models. We work with clinicians to conduct functional validation of novel genes or variants implicated in rare genetic disorders in cellular and zebrafish models. We also work on adapting new technologies for model creation, studying the disease biology at the level of the whole organism as well as the underlying cellular and molecular pathways and are interested in using multiple data-driven approaches to enable the discovery and development of therapeutics. We have developed expertise in the mRNA gene therapy platform and are currently investigating its use as an alternative to protein ERT for specific rare diseases.

- *Rita Rani, N Sushma Sri, Raghavender Medishetti, Kiranam Chatti, Aarti Sevilimedu. Loss of FMRP affects ovarian development and behaviour through multiple pathways in a zebrafish model of fragile X syndrome, Human Molecular Genetics, Volume 33, Issue 16, 15 August 2024, Pages 1391–1405, 2024.*
- *Swati Singh, Sumita Danda, Neetu Sharma, Hitesh Shah, Vrisha Madhuri, Mir Tariq Altaf, Nadia Zipporah Padala, Raghavender Medishetti, Alka Ekbote, SriLakshmi Bhavani, Aarti Sevilimedu, Katta M Girisha. Biallelic Variants in CCN2 Underlie an Autosomal Recessive Kyphomelic Dysplasia. Eur J Hum Genet (06 November 2024).*

MARINA RAJADURAI

Senior Research Scientist

Dr. Marina's primary research focuses on the advancement of drug delivery systems, with a particular emphasis on innovative nanoparticle-based technologies. Her work spans the development of highly efficient and potent delivery mechanisms using platforms such as microneedles, lipid nanoparticles, and hydrogel nano- and microparticles. A critical component of her research involves precise control over the morphology and dimensions of bioactive compounds at the nano- and sub-micro scales, enabling fine-tuning of their biological activity. Formulation scientist with expertise in developing innovative sustained-release and nanoparticle-based drug delivery systems—including patented technologies for targeted, antimicrobial, and imaging applications—Dr. Marina applies a formulation-driven approach to address complex challenges in therapeutic delivery. Her research group is dedicated to engineering advanced delivery platforms that enhance therapeutic efficacy and contribute to overcoming global issues such as drug resistance and nutrient deficiencies.

- *Marina Rajadurai. Microneedle Patch: A Promising Advancement in the Fight Against Iron Deficiency Anemia. Science Featured Series. Published online on 04 September 2024. https://sciencefeatured.com/2024/09/04/microneedle-patch-a-promising-advancement-in-the-fightagainst-iron-deficiency-anemia/*
- *Bhavya Surekha, Parimal Misra, Anitha C. Thippaiah, Bindiganavale R. Shamanna, Aiswarya Madathil, and Marina Rajadurai.* A Microneedle Transdermal Patch loaded with Iron(II) Nanoparticles for Non-invasive Sustained Delivery to Combat Anemia. Materials Advances, 2024, 5, 3247 – 3256, 2024; DOI: 10.1039/D3MA01166F.*

NEELIMA DUBEY
Associate Principal Research Scientist

Our laboratory is dedicated to exploring how the endocrine system regulates brain function. We adopt a "Disease in a Dish" methodology to model various disorders, particularly rare genetic conditions linked to monogenic mutations that affect neurological health. Our research employs patient-derived in vitro disease models, such as immortalized cell lines, lymphoblastoid cell lines (LCLs), induced pluripotent stem cells (iPSCs), and brain organoids, to delve into the molecular mechanisms that govern hormonal influence on brain activity. Furthermore, we are engaged in investigating the pathophysiology of protein aggregation diseases resulting from single-gene mutations. To study these processes, we utilize a range of cellular models, zebrafish models, and recombinant expression systems.

- Arvind A, Sreelekshmi S, Dubey N* Genetic, Epigenetic, and Hormonal Regulation of Stress Phenotypes in Major Depressive Disorder: From Maladaptation to Resilience. Cellular and Molecular Neurobiology. In Press 2025
- Ann Mathew J, Paul G, Jacob J, Kumar J, Dubey N*, Philip SN A New Robust AI/ML Based Model for Accurate Forensic Age Estimation Using DNA Methylation Markers. Forensic Science, Medicine and Pathology. In Press 2025
- Patel S, Govindarajan V, Chakravarty S, Dubey N* From blood to brain: Exploring the role of fibrinogen in the pathophysiology of depression and other neurological disorders. International Immunopharmacology. 143,113-326,2024.

TANDRIKA CHATTOPADHYAY
Associate Principal Research Scientist

Dr. Tandrika's research program focuses on understanding the molecular and cellular mechanisms through which nutrition (macro- and micro-nutrients) affects hepatic physiology, metabolic inflammation, and the development of liver diseases such as non-alcoholic fatty liver disease (NAFLD). Her group employs both in vitro and in vivo approaches, including cellular models and mouse disease models, to dissect the pathways involved in immune activation and disease progression in NAFLD. Dr. Tandrika’s research integrates diverse methodologies across cellular, molecular, and genetic biology to study signal transduction and gene expression changes within pathophysiological contexts. Another significant focus of her lab is the study of inter-organ communication, particularly between the liver and other metabolic tissues including skeletal muscle, adipose tissue, and the pancreas.

- *Ganguly S*, Chattopadhyay T*, Kazi R, Das S, Malik B, Ml U, Iyer PS, Kashiv M, Singh A, Ghadge A, Nair SD, Sonawane MS, Kolthur-Seetharam U. Consumption of sucrose-water rewires macronutrient uptake and utilization mechanisms in a tissue specific manner. J Nutr Biochem. 2025 Jan 29:109850.*

SANDIPAN CHAKRABORTY
Principal Research Scientist

His group uses GPU-enabled high-performance computation to understand the structure and dynamics of biological macromolecules, macromolecular complexes, and biopolymers. The structural insights obtained from computer simulations are used for structure-guided rational engineering of proteins, complemented with AI/ML, with improved efficacy. Also, the group works on computational lipid omics to understand how altered lipid compositions change the dynamics of membrane proteins in diseased conditions, particularly in Alzheimer's disease and different liver disorders. In addition, the works on the application of computer-aided drug discovery/repurposing to identify new lead molecules against different targets of therapeutic significance and characterize the mechanism of drug action.

- *Cholesterol Allosterically Modulates the Structure and Dynamics of the Taurocholate Export Pump (ABCB11). Soundharya Hosamani, Sandipan Chakraborty*. The Journal of Physical Chemistry Letters (2024) 15, 7901-7908.*
- *A multi-tier computational screening framework to effectively search the mutational space of SARS-CoV-2 receptor binding motif to identify mutants with enhanced ACE2 binding abilities. Sandipan Chakraborty*, Chiranjeet Saha. Molecular Informatics (2023) 42, 2300055*
- *Decoding Molecular Factors Shaping Human Angiotensin Converting Enzyme 2 Receptor Usage by Spike Glycoprotein in Lineage B Beta-coronaviruses. Sandipan Chakraborty,* Sanjana Ghosh and Trisha Mondal. BBA - Molecular Basis of Disease (2022) 1868, 166514*

For additional information: https://drils.org/cimps/

SPECIAL INITIATIVES

CENTER FOR RARE DISEASE MODELS (CRDM)

CRDM was inaugurated on 14th March 2024 by Nobel Laureate Physiology or Medicine 2009 Prof. Jack W. Szostak in the presence of Mr. Satish Reddy, Chairman, Dr. Reddy's Laboratories.

Instituting of CRDM was conceived with an objective to:

(a) Develop and characterize models for rare diseases based on clinical interest, Indian relevance and researcher expertise.

- Establish clinical collaborations, and create models for functional validation of novel genes and variants
- Create a repository for zebrafish models for rare diseases in India, for scientific, clinical and industry use
- Study disease biology, uncover novel pathways and targets

(b) Establish POC for novel cutting edge therapies in select rare disease models

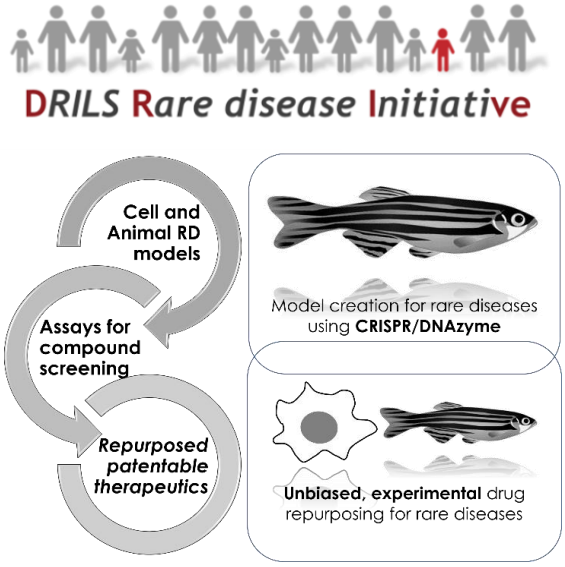
- Gene therapies (including vector based and mRNA)
- Oligo and peptide therapies
- Biologics (Enzyme replacement, antibodies and proteins)
- Gene editing (CRISPR therapies)

(c) Develop AI/ML pipelines to identify novel targets for rare disease therapies

- Generate omics data from rare disease patients (clinical collaboration) and animal models (research collaborations, in-house models) to improve the pipeline
- Establish assays to screen compounds for drug repurposing
- Collaborate with partners for therapy development

DRILS Rare Disease Research Initiative (DRIVE)

A Rare Disease (RD) affects a small subset of the population (usually <1 in 2000) and mostly has a genetic cause. Rare diseases of current interest to us include Fragile-X syndrome, Musculo-skeletal disorders, Lysosomal storage disorders, Mitochondrial diseases, and Inborn errors of metabolism.



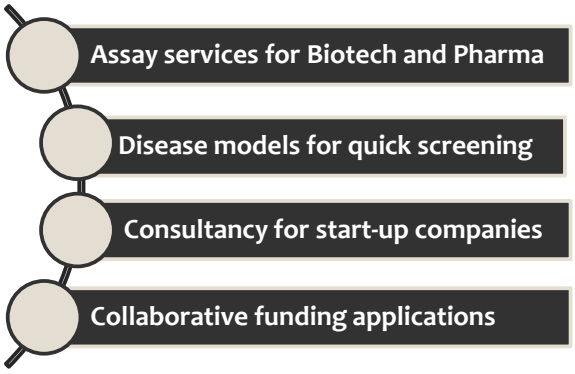
A significant boost to the DRILS Rare Disease Research Initiative has been an ongoing grant from DBT/Wellcome Trust India Alliance as part of a Clinical Research Center focused on Rare Disease research.

Rare disease research activities at DRILS are in three main categories:

- Disease models and assays in cell lines and model organisms to identify novel or untested targets for specific rare diseases.
- Unbiased screening of a large and diverse set of small molecule classes (scaffolds), in throughput assays relevant to rare disease therapy, to identify repurposing candidates.
- Use of large-scale datasets and computational analysis to uncover new, unexpected pathways and targets that may be of therapeutic relevance.

DRILS Capabilities

- State of the art Zebrafish facility
- Stable Zebrafish and cell line models lines using CRISPR technology
- Patented DNAzyme platform technology for rapid, inexpensive model creation in Zebrafish
- Assays for drug screening
- Pipelines for drug repurposing using AI/ML approaches
- Chemistry approaches for small molecule design and synthesis

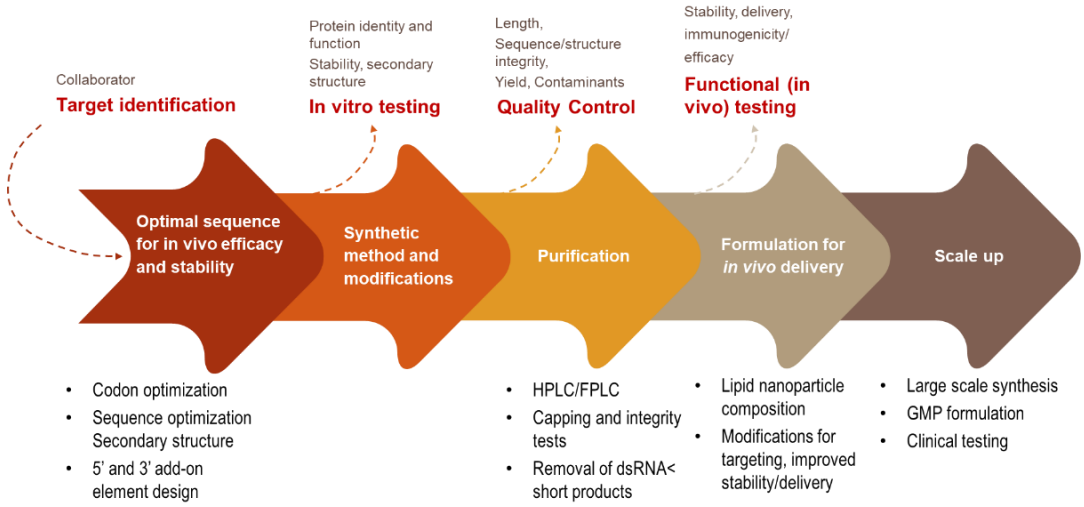


Advanced Gene-Based Therapies

In order to remain updated on the latest advancements in therapy and prepare for the future, we have initiated internal programs focused on advanced gene-based therapies, particularly emphasizing mRNA and adeno-associated virus (AAV) platforms. Initially targeting Rare Monogenic Disorders, we aim to broaden our scope to include additional disease areas.

mRNA Platform

Our efforts in this domain have concentrated on creating innovative reagents and reliable protocols for synthesizing mRNA for any target gene. A key aspect of our



work involves designing a range of modular backbones that encompass all possible variable sequence regions. Through our experimental findings, we aim to determine the most suitable backbone for each prospective therapeutic mRNA to enhance its efficacy in vivo. We are utilizing recombinant enzymes to produce mRNA from a DNA template, with a focus on refining and optimizing conditions to increase the yield of full-length mRNAs, incorporate non-standard building blocks, and implement strategies to safeguard the ends of the mRNAs against degradation.

AAV Platform

Leveraging our expertise in gene delivery through various viral vectors, we are creating rAAV-based gene therapy solutions by developing a platform for the design and small-scale production of rAAVs. Furthermore, we have engineered a proprietary backbone for rAAV production. This construct is modular, allowing for the inclusion or exclusion of different

regulatory elements based on specific needs. Additionally, with the support of our in-house molecular modelling capabilities, we are engineering enhanced capsid variants that

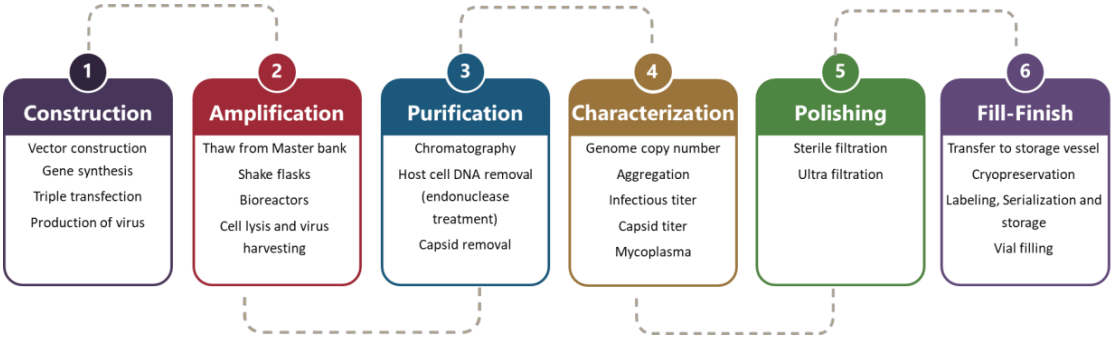
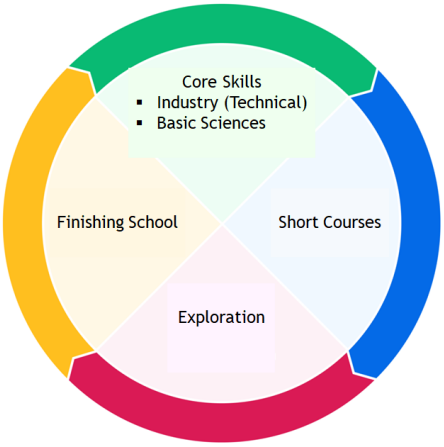


exhibit greater affinity for cell-surface receptors and improved immune evasion characteristics.

Center for Advancement of Research Skills

Creation of a research talent pool for the nation's emerging scientific and research needs has been a key area of activity at DRILS. The Center for Advancement of Research Skills (CARS) is engaged in addressing skill development and training needs in industry and academia. Structured into industry-relevant technical skills and academia-relevant basic science skills, CARS conducts training programs for students and industry professionals. In-house scientists and external experts provide the training depending on the requirements of the program. In collaboration with the Research and Innovation Circle of Hyderabad (RICH), DRILS hosted interns under a Scholarship and Mentorship Programme for Women in STEM Education and Careers, supported by Biocon Foundation.



Team:

Kiranam Chatti
Head, CARS

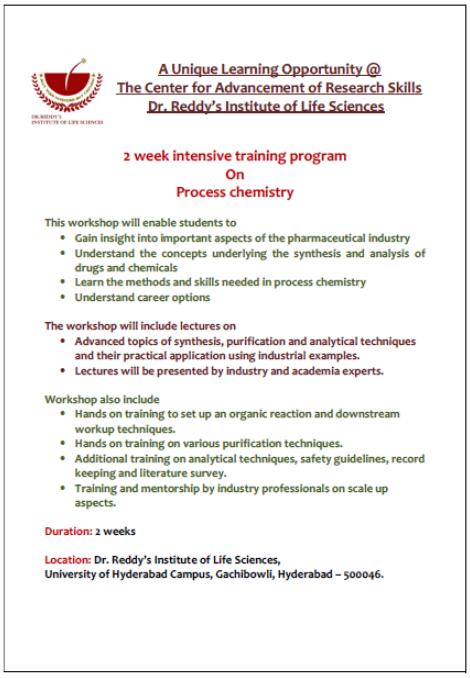
Pallavi Rao
Deputy Head, CARS

For additional information: https://drils.org/cars/

WORKSHOPS

2024-2025

- **Process Chemistry Workshop**



A Unique Learning Opportunity @
The Center for Advancement of Research Skills
Dr. Reddy's Institute of Life Sciences

2 week intensive training program
On
Process chemistry

This workshop will enable students to
- Gain insight into important aspects of the pharmaceutical industry
- Understand the concepts underlying the synthesis and analysis of drugs and chemicals
- Learn the methods and skills needed in process chemistry
- Understand career options

The workshop will include lectures on
- Advanced topics of synthesis, purification and analytical techniques and their practical application using industrial examples.
- Lectures will be presented by industry and academia experts.

Workshop also include
- Hands on training to set up an organic reaction and downstream workup techniques.
- Hands on training on various purification techniques.
- Additional training on analytical techniques, safety guidelines, record keeping and literature survey.
- Training and mentorship by industry professionals on scale up aspects.

Duration: 2 weeks

Location: Dr. Reddy's Institute of Life Sciences,
University of Hyderabad Campus, Gachibowli, Hyderabad – 500046.

An intensive two-week Process Chemistry training program was held in June 2024 for Master's students (MSc in Chemistry) from MNR PG College in Telangana and Sri Satya Sai Institute of Higher Learning in Andhra Pradesh.

- **Flow chemistry workshops**

In 2024, three distinct workshops on Flow Chemistry were held, catering to both industry professionals and academic participants.

2023-2024

- The Faculty of Chemistry organized two workshops in the 2023-2024 academic year: The first workshop took place from May 22 to June 2, 2023, with 16 participants, and the second workshop was held from June 12 to June 23, 2023, with 10 participants. These two-week hands-on training programs concentrated on key elements of the pharmaceutical industry. Participants included students from:
  - DMC College in Goa
  - Kalyani University
  - Diamond Harbour Women's University in West Bengal
  - IIT Guwahati
  - North Eastern Hill University in Shillong.

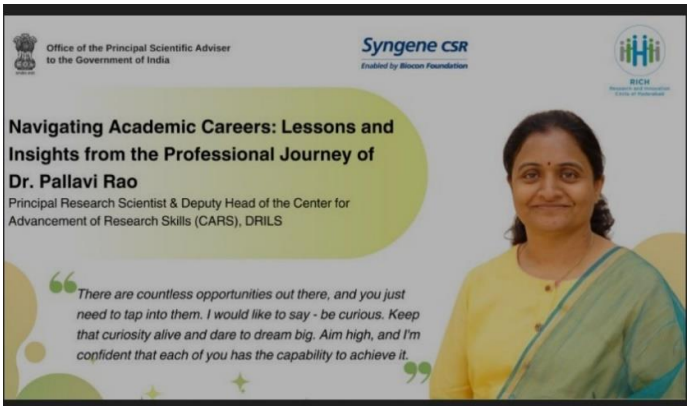
SEMINARS

2024-2025

- **Internal skill enrichment program for CPRI employees**

Seminars on various topics related to process chemistry, documentation and spectroscopy were given.

- **RICH Program**



Seminar conducted to women students under RICH program in August 2024 on "Navigating academic careers: Lessons and insights from the professional journey of Dr. Pallavi Rao"

2023-2024

- **Academia-Industry-Clinic Distinguished Lecture Series**

DRILS organizes the Academia-Industry-Clinic Distinguished Lecture Series to honor the ground-breaking contributions of distinguished individuals whose innovative work significantly addresses unmet medical needs and provides scientific solutions that benefit society as a whole. The following esteemed scientists participated in the A-I-C lecture series from 2022 to 2025.

July 2023: James A Spudich, Stanford University School of Medicine – "Myosin, The exquisite nanomachine: Basic mechanisms to therapies for parasitic diseases"

September 2023: Prof. Avadhesha Surolia, Indian Institute of Science, Benguluru – "Discovery of an allosteric inhibitor of M. tuberculosis ornithine-acetyltransferase: Implications towards novel combinational therapy"

January 2024: Prof. Probal Banerjee, City University of New York – "Creating immune-friendly prodrugs against GBM from chemotherapeutic agents"

March 2024: Prof. Yamuna Krishnan, University of Chicago – "Next-generation targeting has organelle-level precision"

A-I-C
(ACADEMIA – INDUSTRY – CLINIC)
DISTINGUISHED LECTURES
... Celebrating Science

DRILS A-I-C Distinguished Lecture Series celebrates the path-breaking contributions by Eminent Individuals whose pioneering work has a strong impact on addressing unmet medical needs, scientific solutions that impact society at large

Next-generation targeting has organelle-level precision

Yamuna Krishnan
Professor
Department of Chemistry, University of Chicago

About the Speaker:

Prof. Yamuna Krishnan is a professor at the Department of Chemistry, University of Chicago, since August 2014. She has pioneered the interface between DNA nanotechnology and cell biology. Her lab has developed a versatile chemical imaging technology to quantitatively image second messengers in real time, in living cells and genetic model organisms. While her lab is engaged in basic biology - discovering new organellar channels and transporters – she has co-founded two companies –Esya Inc & Macrologic Inc, that utilize her organelle-targeting technology for diagnostics and therapeutics respectively. She is a recipient of the NIH Director's Pioneer Award, the Ono Pharma Breakthrough Science Award, the Infosys Prize for Physical Sciences, Shanti Swarup Bhatnagar Prize in the Chemical Sciences and the Sun Pharma Foundation Award for Basic Medical Research.

Prof. Krishnan's lab has developed a way to target DNA nanodevices to specific cells in vivo, but with organelle-level precision. In 2011, they demonstrated that DNA nanodevices could reach organelles called lysosomes in specific cells of live nematodes, and function as a reporter of pH. Since then, her group has worked on studying the environment within lysosomes.

March 13, 2024, 11.30 AM
Auditorium, Dr. Reddy's Institute of Life Sciences, Hyderabad

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Creating Immune-friendly Prodrugs Against GBM from Chemotherapeutic Agents

Probal Banerjee
Professor of Chemistry, Biochemistry, and Neuroscience
City University of New York at The College of Staten Island

About the Speaker:

Prof. Probal Banerjee is currently Professor of Chemistry, Biochemistry, and Neuroscience at The College of Staten Island, CUNY. He obtained his B.Sc and M.Sc from Jadavpur University, Calcutta, and Ph.D in Bioorganic Chemistry from IISc, Bangalore in 1984. Subsequently, he did his first post-doc in enzymology at Notre Dame and then a second one in neurochemistry and molecular biology at the University of Chicago Medical School. He began his faculty career at the College of Staten Island, City University of New York (CSI, CUNY) as a neuroscientist, and around 2007-2009, he entered the exciting field of cancer biology in which his training in synthetic organic chemistry, biochemistry, and neuroscience came to full use in exploring ways to combat glioblastoma (GBM).

Prof. Banerjee's group works on multiple research areas such as the exploring the use of novel chemotherapeutic agent-Curcumin adducts for GBMs; the possible role of sex female-specific anxiety disorders as well as mechanistic understanding of the role of Fmr1 and PKCepsilon in neuronal development and adult behavior linked to autism. Prof. Banerjee has been the recipient of prestigious awards including the Dolphin Award for Outstanding Achievement in Academic Excellence and Scholarship and Outstanding Achievement in Teaching by a Full Time Faculty Member from CSI, CUNY.

In today's talk, Prof. Banerjee will describe his group's work on using innovative chemistry to make the FDA-approved chemotherapeutic agents safer and more effective against tumors which harbor cancer cells, cancer stem cells, and a large number of immune cells such as macrophages.

January 11, 2024, 11.30 AM
Auditorium, Dr. Reddy's Institute of Life Sciences, Hyderabad

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Discovery of an allosteric inhibitor of M. tuberculosis Ornithine-acetyltransferase: Implications towards novel combinatorial therapy

Avadhesha Surolia
Honorary Professor
Molecular Biophysics Unit (MBU)
Indian Institute of Science
Bangalore

About the Speaker:

Avadhesha Surolia is Honorary Professor at the Indian Institute of Science (IISc), Bangalore. Prof Surolia received his Bachelor's degree in Chemistry and Biology from University of Jodhpur and Master's degree in Biochemistry from University of Baroda. He completed his Ph.D. from Christian Medical College, Vellore in 1978. After his doctoral studies he joined Indian Institute of Chemical Biology (IICB), Calcutta. He joined Molecular Biophysics Unit at IISc as an Associate Professor in 1986 and was Professor at MBU from 1991 to 2013 and served as its Chairman from 2000 to 2006. From 2006-2011 he held the Directorship of National Institute of Immunology, New Delhi. In recognition of his contributions to medicine and science, he was conferred an Honorary D.Sc. degree by Queen's University, Belfast, UK. He is a fellow of TWAS, HSFP and all the science academies in the country. Prof Surolia has been a recipient of numerous awards for his brilliant scientific career including Bhatnagar and Ranbaxy Science Foundation award.

His research work includes extensive characterization of lectin structure and interactions, orientation and dynamics of cell surface carbohydrate receptors and protein folding. He also has done path-breaking work on diabetes, anti-malarials and anti-cancer agents based on curcumin, flavonoids, etc. In addition, tuberculosis, neuropathic pain, neurodegenerative disorders and the link between immunity and obsessive–compulsive disorder are also areas of his current interest.

September 12, 2023 12.00 PM
Auditorium, Dr. Reddy's Institute of Life Sciences, Hyderabad

A-I-C
(ACADEMIA – INDUSTRY – CLINIC)
DISTINGUISHED LECTURES
... Celebrating Science

DRILS A-I-C Distinguished Lecture Series celebrates the path-breaking contributions by Eminent Individuals whose pioneering work has a strong impact on addressing unmet medical needs, scientific solutions that impact society at large

Myosin, The Exquisite Nanomachine: Basic Mechanisms to Therapies for Parasitic Diseases

James A Spudich
Douglass M. and Nola Leishman Professor of Cardiovascular Disease, Emeritus
Stanford University School of Medicine

About the Speaker:

James A Spudich is Leishman Professor of Cardiovascular Disease and Professor of Biochemistry, Stanford. He received his B.S. in chemistry (University of Illinois) and his Ph.D. in biochemistry (Stanford). He did postdoctoral work in genetics (Stanford) and in structural biology (MRC-LMB, Cambridge, England). From 1971-present, he has held academic positions at UCSF and Stanford. From 1998-2002, he was Co-Founder and first Director of the Stanford Interdisciplinary Program called Bio-X. He is also Adjunct Professor at the National Center for Biological Sciences, TIFR and InStem in Bangalore, India. He also was a Founder of both Cytokinetics, Inc. and MyoKardia, Inc, biotech companies that are developing therapeutics that target the sarcomere. He was elected to the National Academy of Sciences in 1991, and has received numerous awards, including the Albert Lasker Basic Medical Research Award in 2012.

The research interests of his group have included the molecular basis of energy transduction that leads to ATP-driven myosin movement on actin, and the roles of the myosin family of molecular motors in eukaryotic cells. His group has developed multiple new tools, including in vitro motility assays taken to the single molecule level using laser traps. And are now applying these tools toward an understanding of normal and diseased human cardiac function.

July 26, 2023, 4.30 PM
Auditorium, Dr. Reddy's Institute of Life Sciences, Hyderabad

RICH Interns Research Program

Research and Innovation Circle of Hyderabad (RICH) is the nodal agency for Hyderabad Science & Technology (S&T) Cluster, an initiative of the Office of Principal Scientific Advisor (PSA) to the Government of India. Launched in 2017 by the Government of Telangana, RICH acts as a facilitator and aims to foster greater collaboration between various entities in the research and innovation space. Under this programme, DRILS provided internship opportunity for under-graduate and post-graduate women students in their final year to spend two to six months of training in partnership with Biocon Foundation.

2024-2025

- The RICH interns participated in an extensive six-month training program at DRILS, which encompassed various specialized subjects in Biology and Chemistry, along with AI/Data Science for this year. Their research topics were as follows:
  - Investigating advancements in drug delivery and analytical methods, focusing on patches, nanoparticles, and UV techniques.
  - Developing CRISPR-based methods for point mutation knock-in in zebrafish, with an emphasis on optimizing single-stranded oligonucleotide donor (ssODN) strategies and allele-specific PCR screening.
  - Conducting histological examinations of acute striatal injury caused by high dietary protein in GCDH-deficient zebrafish.
  - Techniques for assessing mitochondria function in zebrafish models for rare genetic disorders
  - Phenotypic screening- Computational analysis of zebrafish images for classification using deep learning techniques (AI).
  - Analytical chemistry internship on Analytical method: HPLC was done by a trainee from Rashtrasant Tukdoji Maharaja Nagpur University in Maharashtra as part of the RICH program.

2023-2024

- The RICH program provided students with a six-month hands-on experience, during which the trainees acquired knowledge in various topics, including:
  - Modeling and validating nephrotoxicity in zebrafish
  - Characterization of heterozygous Duchenne muscular dystrophy zebrafish through heteroduplex mobility assay
  - Evaluating the genotoxic effects of metal oxide nanoparticles using zebrafish as a model system

2022-2023

- The interns gained research experience on various topics such as: Insilico analysis of inflammatory gene signature in macrophages from NAFLD patients; Comparison of prokaryotic and eukaryotic rhodopsin sequences with an aim to understand GPCR evolution; Characterization of zebrafish CRISPR mutant; Characterization of c-met phlpp double mutant zebrafish line.

Other Internship & Training Programs

2024-2025

- A two-week internship for a chemical engineering student from B. V. Raju Institute of Technology (BVRIT) in Narsapur took place in August 2024.
- Additionally, a PhD student from the Manipal School of Life Sciences in Manipal, Karnataka, began a two-month internship during November and December 2024.
- Student interns from Apollo University, Chittoor, Andhra Pradesh underwent 6 months training on varied research areas such as:
  - Zebrafish-based high-throughput drug screening: an innovative platform for pharmacological testing and toxicity assessment
  - Modelling of met exon 14 deletion in zebrafish using crispr/cas9: insights into development & disease
  - Screening for different mutations in hspb8 gene using zebrafish model

2023-2024

- Four student interns were mentored at CPRI with varied training time and topics during 2023:
  - One-year internship on “A synthesis of phosphate ester: An investigation through batch and Continuous flow technique.” by Abhinandan Ravindra Koot from MIT Manipal was submitted in October 2023.
  - Prajwal Hanamapure from MIT Manipal submitted M.Tech thesis titled “An investigation of Pictet Spengler reaction through continuous flow chemistry approach

B) Swern Oxidation in Continuous Flow Mode in July 2023 after completion of one-year internship.

- Sowmya. S from VIT, Vellore after her 6 month internship under RICH program hosted by DRILS submitted MSc thesis in June 2023 titled "Synthesis of Urea Derivatives Using Mukaiyama Reagent."
- P.V Vinay from National Institute of Technology, Agartala worked on Process development of industrially relevant organic reactions during his 2 month internship.


- Apart from the above Internal periodic training sessions for in-house employees on chemistry topics relevant to the process chemistry were conducted.



2022-2023

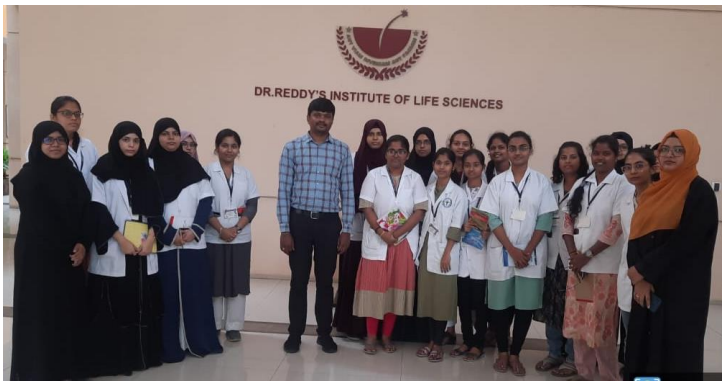
- A Summer Internship Program for six students from Agha Khan Academy in Hyderabad took place from July 13 to July 22, 2022. During this program, each student received training in various techniques, including the collection of samples (such as water from zebrafish tanks, soil, twigs, leaves, and flowers), preparation of LB agar plates, colony PCR, gDNA isolation and purification, qPCR, and RFLP methods.

DRILS Facility Visits

DRILS has taken this initiative to create awareness in school students about exciting field of Life Sciences and Research, to motivate them to pursue it as a professional path.

2024-2025

- On September 9, 2024, M. Pharma students from the Department of Pharmacology at RBVRR Women's College of Pharmacy in Barkatpura, Hyderabad, visited DRILS. The purpose of their visit was to explore the use of Zebrafish as a sustainable model in our research initiatives. Our scientist Dr. Raghavender Medishetty provided them with valuable insights during his presentation titled “Zebrafish as a Model for Pharmacological and Toxicological Research.”



- In August 2024, students from the Sri Sathya Sai Institute of Higher Learning participated in an industry visit. The group comprised 23 students, 4 research scholars, and 2 faculty members from the Department of Chemistry at the PSN Campus of SSSIHL. During the visit, they explored both CIMPS and CPRI, gaining valuable insights into the research opportunities available in Biology and Chemistry, as well as their possible applications in industry.

2023-2024

- High school students from Jain Heritage School, Kondapur (grade IX and X) visited DRILS premises, had a facility tour and interacted with our PhD students and Scientists. All the 70+ students had an opportunity to visit Chemistry and Biology wings of the Institute, were briefed about our research areas, instruments and the techniques used in R&D facility along with presentation on overview of Computational biology.

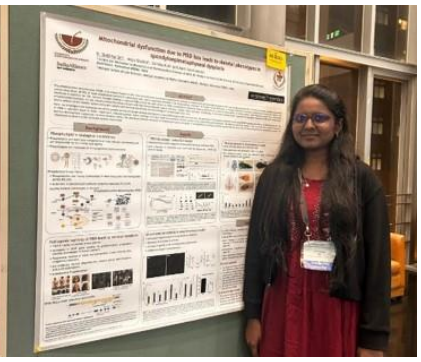
- Second-year B. Tech Biotechnology students from the Department of Biotechnology at Vignan's Foundation for Science, Technology & Research (Deemed to be University) in Vadlamudi, Guntur, Andhra Pradesh, visited CIMPS on March 22, 2024.

Initiative was taken by Dr. Sandipan Chakraborty under DST-SERB: SSR (Scientific Social Responsibility) to brief the students about CIMPS research areas and a presentation on "Exploring the intersection of Biology and Computation –From Bytes to Biology" was given. The presentation centered around the theme "fusion of computation and biology", illustrating how it can give profound insights into the essence of life itself.

POSTER PRESENTATION

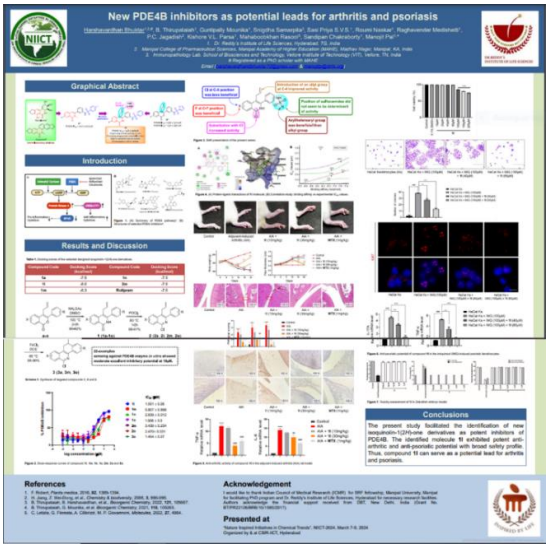
2024-2025

- Our Ph.D. scholar, Ms. Sushma, attended the Keystone Symposia meeting on "Mitochondrial biology in health and disease" held in January 2025 at NTUH International



Convention Center, Taipei city, Taiwan. She also received a Science Fund grant from Keystone Symposia for attending this meeting and showcased her poster titled "Mitochondrial dysfunction due to PISD loss leads to skeletal phenotypes in Spondyloepimetaphyseal dysplasia".

- Ph.D Scholar from DRILS Mr. Harshavardhan Bhuktar, B, received one of the BEST POSTERS AWARD for his poster on "New PDE4B inhibitors as potential leads for arthritis and psoriasis" presented at "Nature Inspired Initiatives in Chemical Trends", NIICT-2024, March 7-9, 2024, Organized by & at CSIR-IICT, Hyderabad.



https://drils.org/best-poster-award/

CENTER FOR PROCESS RESEARCH INNOVATION

The Center for Process Research Innovation (CPRI) is engaged in addressing chemical research and innovation needs of the industry. CPRI has two main thrust areas: Process R&D and Medicinal Chemistry. Process research involves the identification and development of novel synthetic routes that targets sustainability through simplicity with potential for IP generation. Chemical industry needs are met not only by de novo approaches, but also through evolution of synthetic routes through a continuous process of incremental improvement and gradual simplification of the existing chemical processes.

TEAM:

SRINIVAS ORUGANTI
Director, DRILS and Head, CPRI

SAIKAT SEN
Deputy Head, CPRI

VISHNUVARDHAN ELLA
Principal Research Scientist

PALLAVI RAO
Principal Research Scientist

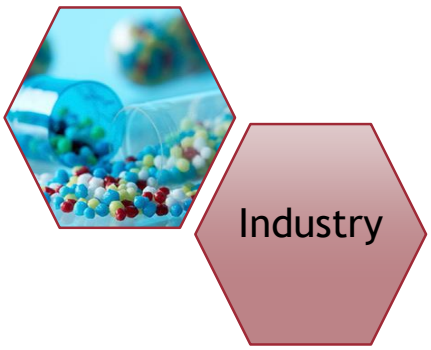
For additional information: https://drils.org/cpri/

Key Industry-Oriented Research Areas @ CPRI

- Catalysis, Chiral or Complex Intermediates
- Catalysts and Ligands, Flow Chemistry
- Environmental impact and greener processes
- HIV or Hep-C inhibitors, anti-infectives, anti-cancer compounds
- Polymeric APIs and import-substituting excipients
- Peptides, Biosimilars, Strain development, Fermentation technology

Industry Patents @ CPRI

- Narrowband blue quantum dots, US 20230174861 A1
- Ceritinib and intermediates, WO 2016199020
- Eribulin and intermediates, WO 2020008382
- Vilazodone hydrochloride and free base, US 10011590B2
- Regorafenib and polymorph, WO 2015011659
- Suvorexant and intermediates, WO 2015008218
- Fingolimod and salts, US 9216943B2
- Telaprevir intermediates, WO 2014045263
- Boceprevir intermediates, WO 2013190509
- Saxagliptin and salts, WO 2013175395 A3
- Mirabegron and intermediates, IN 2221/CHE/2012 A



SPECIAL INITIATIVES

FLOW CHEMISTRY TECHNOLOGY HUB (FCT HUB)

The CoE for Flow Chemistry (also known as Flow Chemistry Technology Hub or FCT-Hub) has been set up at DRILS with patronage from the Government of Telangana State and in partnership with Dr Reddy's and Laurus Labs. An agreement to this effect was signed on 25 November 2021. The FCT Hub was inaugurated on May 4, 2022, by Shri Jayesh Ranjan, Principal Secretary for Industries and Commerce and Information Technology. This hub, located at the Dr. Reddy's Institute of Life Sciences, is a multi-industry supported initiative aiming to promote flow chemistry techniques in pharmaceutical R&D and manufacturing.

The Hub is poised to work on twin objectives:
(a) Create strong research orientation & training to industry scientist to enable translation of batch process to flow process for the reasons of safety, efficiency and robustness; and

(b) Provide a strong platform among laboratory, manufacturing setups, various cross functional teams and expertise through DRILS connections and knowledge partners for a "***green ecosystem***".

GRANTS AND FUNDING

ONGOING				
Title	**Agency**	**PI, Co-PI**	**Duration**	**Funding**
Small molecule and gene therapies for Glutaric Aciduria Type I, an Inborn Error of Metabolism (IEM) disorder	ICMR	Aarti Sevilimedu	2025-2028	₹1,89,39,929
Repositioning of mitochondria-targeted FDA approved small molecules, and development and testing of a novel mRNA-based MFN2 gene therapy for Mitochondrial Skeletal Disorders (MSDs)	ICMR	Aarti Sevilimedu	2024-2027	₹1,18,00,000
Design and development of gene therapy for methylmalonic academia	ICMR	Kishore Parsa	2024-2027	₹1,23,00,000
Understanding the functional significance of RNA exosome complex sub-unit EXOSC1, implicated in the rare disease pontocerebellar hypoplasia, using cellular and zebrafish model systems	DBT	Kishore Parsa	2024-2027	₹ 88,90,000
Understanding the functional role of co-activator binding protein PIMT in macrophage mediated insulin resistance in rodents and humans	DBT	Prof. Parimal Misra and Dr. Partha Chakraborti	2024-2027	₹ 94,50,000
Investigating the role of nutrient dependent Olinked Glycosylation of SIRT6 in regulating hepatic functions and physiology	SERB-DST	Tandrika Chattopadhyay	2024-2026	₹30,00,000
Probing the Altered Microheterogeneity of Alzheimer's Brain using Computational Lipidomics	AMD's High Performanc e Compute Fund	Sandipan Chakraborty	2024-2025	14400 Node hours allocation on AMD HPC

Title	Agency	PI, Co-PI	Duration	Funding
Prediction of Idiosyncratic Drug Induced Liver Injury (iDILI): A comprehensive in silico, in vitro and in vivo based multi-tier screening approach	ICMR	Sandipan Chakraborty	2023-2026	₹64,70,000
Pre-clinical evaluation of hits identified against 12R-lipoxygenase as potential anti-psoriasis drugs	IoE, UoH	Dr. Nooruddin (UoH) Dr. Manojit Pal	2023-2024	₹1,66,00,000
Understanding the regulatory role of co-activator binding protein PIMT in the pancreatic b-cells of diabetic animals and T3C diabetic (Chronic pancreatitis) humans	DST-SERB	Parimal Misra	2021-2024	₹45,13, 696
Identification of the mechanistic basis of early striatal damage in glutaric aciduria Type I	DBT	Aarti Sevilimedu, Pushkar Kulkarni, Dr. A. Radha Rama Devi (Rainbow hospitals)	2018-2022	₹40,66,800
Identification of optimal therapeutic window for efficacious intervention in a Zebrafish model of fragile X syndrome	DBT	Aarti Sevilimedu, Pushkar Kulkarni, Kiranam Chatti	2019-2022	₹49,57,000
Use of DNAzymes to improve CRISPR-mediated knock-in	DBT	Kiranam Chatti Aarti Sevilimedu	2018-2022	₹65,84,000
Molecular analysis of the functional role of ser/thr phosphatase PHLPP in lipid induced formation of foam cells, a hallmark of atherosclerosis	DBT	Kishore Parsa Kiranam Chatti	2019-2022	₹56,24,998
A microneedle transdermal patch for supplementing critical micronutrients for prevention and control of anemia	DBT	Marina Rajadurai, Parimal Misra Dr. B.R. Shamanna (UoH) Dr. C. T. Anitha (UoH)	2020-2023	₹67,90,920
Molecular characterization of the functional role of ser/thr phosphatase PHLPP in pancreatic beta cells to gain mechanistic insights into diabetes	SERB	Kishore Parsa Parimal Misra, Pushkar Kulkarni Prof. Prakash Babu (UoH) Dr. Sasiskala M (AIG-AHF)	2020-2023	₹54,94,004

Title	Agency	PI, Co-PI	Duration	Funding
Understanding the functional role of co-activator binding protein PIMT in adipogenesis and obesity	DBT	Parimal Misra, Kishore Parsa Prof. Satyamoorthy (MAHE) Dr. Manjunath Joshi (MAHE)	2020-2023	₹64,21,533
Studies on the role of HDAC inhibitors in reprogramming cancer cell metabolism to reverse cisplatin resistance in patient derived xenograft model of ovarian cancer.	ICMR	Prasenjit Mitra (Co-PI) , Dr. Vasudha Devi (Pharmacology MMMC, MAHE PI) Dr. Naveena AN Kumar (MAHE, Co-PI, KMC, Surgical Oncology)	2021 - 2024	₹27,00,000
Center for rare disease diagnosis, research and training	India Alliance/ Wellcome -DBT	Dr. Girisha KM (MAHE), Dr. Akhilesh Pandey (IOB), Aarti Sevilimedu (DRILS)	2021-2026	₹2,25,00,000
Functional Analysis of PHLPP1 in Myogenesis: Implications for skeletal muscle dystrophies	DBT	Kishore Parsa, Kiranam Chatti and Aarti Sevilimedu	2022-2025	₹92,86,720
Molecular Insights into Ligand-selective and Cholesterol-specific Activation of the GPCR Serotonin1A Receptor with GPU-enabled High-performance Computing grant	DST-SERB	Dr. Sandipan Chakraborty	2021-2024	₹46,74,640
Developing a Wearable, Light Concentrating, Photonic Micro-Sphere Patch for On-the-Go Outdoor/Indoor Photodynamic Therapy	HEFA	Dr. Marina Rajadurai	2023-2025	₹5,00,000
Molecular characterization of the functional role of ser/thr phosphatase PHLPP in pancreatic beta cells to gain mechanistic insights into diabetes	DST-SERB	Dr. Kishore Parsa Dr. Parimal Misra	2020-2023	₹54,94,004
Understanding the functional role of co-activator binding protein PIMT in adipogenesis and obesity	DBT	Dr. Parimal Misra Dr. Kishore Parsa	2020-2023	₹64,21,533
Understanding the regulatory role of co-activator binding protein PIMT in the pancreatic b-cells of diabetic animals and T3C diabetic (Chronic pancreatitis) humans	DST-SERB	Dr. Parimal Misra	2021-2024	₹45,13,696

Title	Agency	PI, Co-PI	Duration	Funding
Functional Analysis of PHLPP1 in Myogenesis: Implications for skeletal muscle dystrophies	DBT	Dr. Kishore Parsa	2022-2025	₹9,08,672
Molecular Insights into Ligand-selective and Cholesterol-specific Activation of the GPCR Serotonin1A Receptor with GPU-enabled High-performance Computing grant	DST-SERB	Dr. Sandipan Chakraborty	2021-2024	₹46,74,640
A pre-clinical lead optimization study of adjunct medicaments for reducing duration and increasing efficacy of anti-tuberculosis drug therapy	DBT	Dr. Manojit Pal Dr. Parimal Misra Dr. Kishore Parsa	2022-2025	₹1,99.98,000
Prediction of Idiosyncratic Drug Induced Liver Injury (iDILI): A comprehensive in silico, in vitro and in vivo based multitier screening approach	ICMR	Dr. Sandipan Chakraborty	2023-2026	₹67,00,000
Functional Analysis of PHLPP1 in Myogenesis: Implications for skeletal muscle dystrophies	DBT	Dr. Kishore Parsa	2022-2025	₹90.86,720

PUBLICATIONS AND PATENTS

PUBLICATIONS

1) Anushka Arvind, Sreelekshmi S, Neelima Dubey (2025). Genetic, Epigenetic, and Hormonal Regulation of Stress Phenotypes in Major Depressive Disorder: From Maladaptation to Resilience. Cellular and Molecular Neurobiology, 45:29.
2) Swati Singh, Sumita Danda, Neetu Sharma, Hitesh Shah, Vrisha Madhuri, Tariq Altaf Mir, Nadia Zipporah Padala, Raghavender Medishetti, Alka Ekbote, Gandham SriLakshmi Bhavani, Aarti Sevilimedu, Katta M. Girisha (2025). Biallelic variants in CCN2 underlie an autosomal recessive kyphomelic dysplasia. European Journal of Human Genetics, 33 (1): 30-37. ***DOI: 10.1038/s41431-024-01725-5***.
3) Mathew JA, Paul G, Jacob J, Janesh Kumar, Neelima Dubey, Ninan Sajeeth Philip (2025). A new robust AI/ML based model for accurate forensic age estimation using DNA methylation markers. Forensic Science, Medicine and Pathology. ***https://doi.org/10.1007/s12024-025-00985-x*2024**
4) Rabindra Nath Pradhan, Suvam Kumar Panda, Julia Torres, Carlos Kremer, Shrutika Kavali, Neelima Dubey, Suprava Naik, Akhilesh Kumar Singh. A mono-aquated di-pyridine-based Gd(III) complex as T1-weighted MRI probe with high relaxivity and stability (2024) Inorganica Chimica Acta, 561: 121845. DOI: https://doi.org/10.1016/j.ica.2023.121845
5) Harshavardhan Bhuktar, B., Thirupataiah, Guntipally Mounika, Snigdha Samarpita, Arulkumaran Rithvik, S.V.S., Sasi Priya, Roumi Naskar, Raghavender Medishetti, Jagadish, P.C., Kishore V.L. Parsa, Mahaboobkhan Rasool, Sandipan Chakraborty, Manojit Pal. Targeting next-generation PDE4 inhibitors in search of potential management of rheumatoid arthritis and psoriasis (2024) Bioorganic Chemistry, 107689. DOI: https://doi.org/10.1016/j.bioorg.2024.107689
6) Rambabu Dandela, Manojit Pal. Organic Chemistry-Biology Interface research activities in India (2024) Bioorganic Chemistry, 108031. DOI: https://doi.org/10.1016/j.bioorg.2024.108031.
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PATENTS

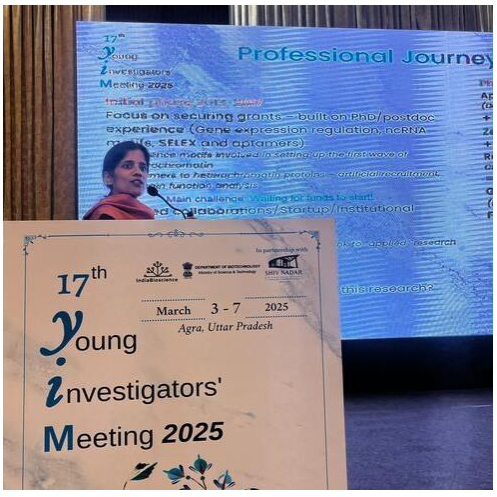
515132, granted on 26/02/2024 for “Embryonic Zebrafish models using DNAzyme mediated knockdown” by Sevilimedu A, Kulkarni P assigned to Dr. Reddy’s Institute of Life Sciences.

EVENTS

DR. KALLAM ANJI REDDY MEMORIAL LECTURE – 2025

The third annual Dr. Kallam Anji Reddy Memorial Lecture took place on March 15, 2025. Centered on the theme 'Science, Society and Sustainability,' this lecture series was established in 2023 to honor our founder and celebrate the vision of Dr. K. Anji Reddy, a renowned scientist, entrepreneur, and philanthropist. This year's lecture featured the esteemed oncologist Prof. Ashok Venkitaraman, who serves as the Director of the Cancer Science Institute of Singapore and is a Distinguished Professor of Medicine at the National University of Singapore. The keynote address was delivered by Dr. Gullapalli Nageswara Rao, the founder of the L. V. Prasad Eye Institute in Hyderabad.

DR. AARTI SEVILIMEDU: INVITED SPEAKER AT 17TH YOUNG INVESTIGATORS' MEETING 2025, AGRA, UTTAR PRADESH, INDIA



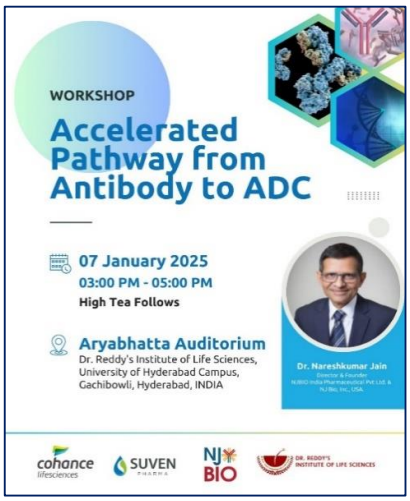
The Seventeenth Young Investigators' Meeting (YIM 2025) took place in Agra, Uttar Pradesh, from March 3rd to 7th 2025. This prominent event was organized by India Bioscience with the support of the Department of Biotechnology, Government of India, in collaboration with the Shiv Nadar Institution of Eminence. The YIM served as a platform for outstanding young researchers, senior scientists, institutional leaders, and representatives from funding organizations to engage in discussions centered on careers in life sciences, mentorship, and networking opportunities. Dr. Aarti Sevilimedu, a Senior Principal Investigator from Dr. Reddy's Institute of Life Sciences (DRILS), was a notable invited speaker at the meeting, where she provided valuable insights on the use of Zebrafish as a model organism for translational research.

INDOPHARMA CONNECT: ACADEMIA EXPLORATORY VISIT TO DRILS

DRILS had the privilege of hosting the IndoPharma Connect: A Platform for Fostering Industry-Academia Collaborations in the Pharmaceutical Sector, in partnership with the University of Hyderabad, Pune Knowledge Cluster (PKC), and the Indian Pharmaceutical Alliance (IPA). This event

marked the inaugural Academia Exploratory visit at our Institute on 11th February, 2025. The expert committee comprised notable members, including Prof. BJ Rao, Vice-Chancellor of UoH; Dr. Shekher Mande, Former Director General of CSIR; Dr. Shridhar Narayanan, Senior Technical Advisor at IPA; Dr. Priya Nagaraj, CEO of PKC; and Dr. Srinivas Oruganti, Director of DRILS. Delegates from pharmaceutical companies, IPA, PKC, and various industrial partners took part in the exploratory visit at DRILS. This initiative aims to foster productive partnerships between the academic community and industry participants.

PRESENTATION BY DR. NARESH KUMAR JAIN, CEO NJ BIO



An insightful workshop titled “Accelerated Pathway from Antibody to ADC,” presented by Dr. Nareshkumar Jain, CEO of NJ Bio, took place at Dr. Reddy's Institute of Life Sciences (DRILS) on 7th January 2025.This event was held in partnership with Cohance Life Sciences, Suven Pharmaceuticals, and NJ Bio. The session offered an in-depth exploration of antibody-drug conjugates (ADCs), focusing on their design, mechanisms, and significant impact on targeted cancer treatments. Dr. Jain's ability to simplify intricate ideas and his commitment to furthering medical science contributed to an enlightening experience, serving as a catalyst for innovation in the healthcare sector.

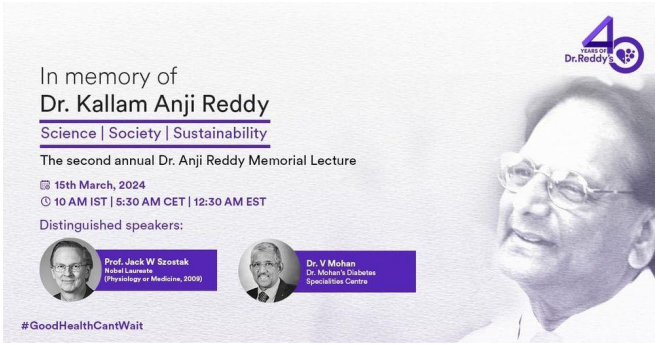
DISTINGUISHED LECTURE BY DR. NEELIMA DUBEY, SNCI – 2024

SNCI (The Society for Neurochemistry, India) in association with Punjab University organized an International Conference on Innovations and Future Perspectives in Neurochemistry during their 38th Annual Meeting of Society for Neurochemistry (India) from 26th to 28th September 2024. One of our faculties from CIMPS Dr. Neelima Dubey, Associate Principal Research Scientist was invited as a distinguished speaker. She delivered talk on "Dysregulated Glutamate Trafficking Driven by Neuro-inflammation in Major Depressive Disorder".

DRILS: A DIAMOND WINNER IN THE PRIVATE INSTITUTE CATEGORY BY CII

The CII Industry-Academia Partnership Awards, organized by the Confederation of Indian Industry (CII), honor and celebrate the achievements of industry and academic institutions that excel in promoting research, cultivating market-relevant skills, and generating sustainable employment opportunities through collaborative efforts. Dr. Reddy's Institute of Life Sciences (DRILS) has been awarded the prestigious Diamond Winner title in the Private Institute Category at the CII Industry-Academia Partnership Awards 2024 which took place in New Delhi on October 28, 2024.

DR. KALLAM ANJI REDDY MEMORIAL LECTURE-2024



The second annual Dr. Anji Reddy Memorial Lecture was delivered by Nobel Laureate in Physiology or Medicine, 2009, Professor Jack W. Szostak on the topic 'RNA and the Origin of Life'. On this occasion Dr. V. Mohan, Padma Shri awardee paid tribute to the life and legacy of Dr. Anji Reddy.

https://drils.org/dr-kallam-anji-reddy-memorial-lecture-2024/

LECTURE BY DR. NEELIMA DUBEY: BIOSKILL DEVELOPMENT PROGRAMME

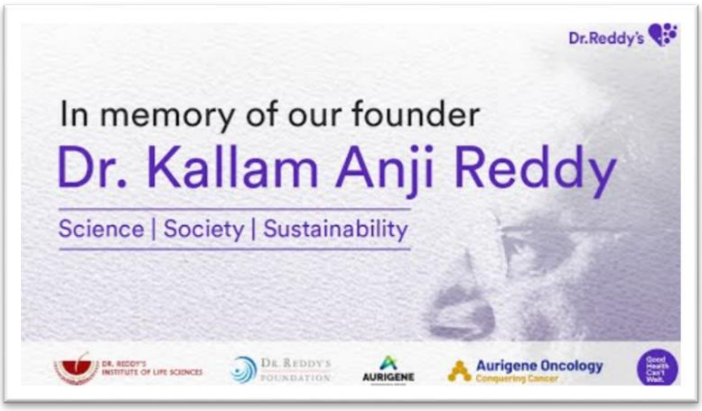
As part of "Skill India Mission" of Government of India, GSBTM-IICT BioSkill Program was organized by CSIR-IICT, Hyderabad. Dr. Neelima Dubey, Associate Principal Research Scientist of DRILS was invited to deliver a lecture on "The Scope of Diverse Cell Lines in Biomedical Research: Challenges & Applications". The lecture was delivered on 9th February, 2024 at 10:00 am, Chemical Biology Seminar Hall, CSIR-IICT, Hyderabad wherein the speaker also shared her research experiences with the young students to encourage them to take up research as their career.

CONCLAVE ON "ADVANCES IN ORGANIC SYNTHESIS & CONTINUOUS FLOW TECHNOLOGIES"

Conclave on "Advances in Organic Synthesis & Continuous Flow Technologies was organized by DRILS on 12th February 2024. Experts in the field from across India and from Switzerland addressed the gathering with their intriguing talks. The eminent personalities were from both academia and industrial sectors.

https://drils.org/conclave-advances-in-organic-synthesis-continuous-flow-technologies/

DR. KALLAM ANJI REDDY MEMORIAL LECTURE – 2023



Scientist, entrepreneur and philanthropist Dr. Kallam Anji Reddy was among the pioneers of the Indian pharma industry. He was extremely passionate about drug discovery and making medicines affordable. In memory of our founder Dr. Anji Reddy Memorial lecture was organized by DRILS in association with DRL and Auregene on 15th March 2023.

DRILS RARE DISEASE RESEARCH SUMMIT – 2023

Rare Disease Research Summit was organized by DRILS in association with PATS, Indian Academy of Pediatrics, Rainbow Children's Hospitals on 28th February 2023. Dr. Lokesh Lingappa, Neurologist, Rainbow Hospitals; Dr. Naresh Babu, Professor, UoH; Dr. Radha Ramadevi, Pediatrician-Genetics, Rainbow Hospitals; Dr. Indumathi Mariappan, Scientist, LV Prasad Eye Institute; Dr. Girisha, Professor, Kasturba Medical College; Dr. Aarti Sevilimedu, Principal Research Scientist, DRILS were the speakers for the event. Many other eminent Scientists and guests graced the occasion.

FCT SUMMIT 2022

DRILS, in partnership with RSC, organized a two-day symposium (**"Flow Chemistry Technology Summit 2022"**, **4-5 November 2022**) to highlight the pivotal role played by Flow Chemistry & Continuous Manufacturing in accelerating innovation to support sustainable chemical processes in the

pharmaceutical and chemical industry in general.

INTERNATIONAL SYMPOSIUM ON *RECENT ADVANCES IN PAHRMACEUTICAL SCIENCES"

Virtual International Symposium on "Recent Advances in Pharmaceutical Sciences was held from 11th to 13th May 2022 in association with University of Hyderabad and Universidad de, Antioquia, Columbia

COMMITTEES

INSTITUTIONAL BIOSAFETY COMMITTEE (IBSC)

In compliance with the IBSC rules, new IBSC committee was constituted in October 2023 that would be effective untill next three years. Two meetings in 2023 and one meeting (untill today) in 2024 were conducted. Along with review of ongoing research projects, new projects were proposed in every meeting for approval by IBSC and RCGM. The committee included Chairman Dr. Kishore Parsa (HOD, CIMPS), DBT nominee Dr.Sharmistha Banerje Professor, University of Hyderabad, Hyderabad), Member secretary Dr. Aarti Sevilimedu (Principal Research Scientist, DRILS), Biosafety Officer Dr. Anupama T Row (Chief Medical Officer, Health Center, UoH), External Expert Dr Suresh Juluri (Head, Pre-Clinical Biology, Aurigene Pharmaceutical Services Ltd., Hyderabad) and internal members Dr. Kiranam Chatti (Senior Principal Research Scientist, DRILS), Dr. Rita Rani (Scientist, DRILS), Dr. Neelima Dubey (Associate Principal Research Scientist, DRILS), Dr. Tandrika Chattopadhyay (Associate Principal Research Scientist, DRILS) and Dr. Tanuja Kosuri (Research Manager, DRILS). Along with the ongoing research projects (21), two new projects were proposed and subsequently approved by IBSC and RCGM.

INSTITUTIONAL ANIMAL ETHICAL COMMITTEE (IAEC)

As per the CPCSEA (Committee for the Purpose of Control and Supervision of Experiments on Animals) norms, two meetings of the DRILS Institutional Animal Ethics Committee (IAEC) were held in the year 2024. New IAEC committee that would be active for the next five years has been constituted in January 2024. The thirteen ongoing proposals were renewed without incident and the requisite documents were submitted. The list of new IAEC members is as shown in the Table here under:

Internal IAEC Members		
S. No	Member Name	Designation & Organizarion
1	Dr. Kiranam Chatti	Chairperson Scientist In Charge of animal house facility
2	Dr. Tanuja Kosuri	Member Secretary
3	Dr. Rita Rani	Scientist from different biological discipline
4	Dr. Sai Latha Subbu	Biological Scientist
5	Dr. Tandrika Chattopadhyay	Scientist from different biological discipline
CCSEA Nominated Members for IAEC		
1	Dr. Sachin Singh vetsachin@gmail.com	Main Nominee Scientist, Transgenic and Gene Knockout Facility, Animal House, II Floor, CCMB, Hyderabad, Telangana
2	Dr. B. Vasudha vasudhapharmacy@cvsr.ac.in	Link Nominee Anurag university, Hyderabad, Telangana
3	Dr. Nandkumar Sureshrao Doijad dr.doijad1988@gmail.com	Scientist from outside of the Institute National Institute of Pharmaceutical Education and Research (NIPER), Balanagar, Hyderabad, Telangana
4	Ms. Madhuri Latha Thadanki madhurithadanki31@gmail.com	Socially aware Nominee CMR College of Pharmacy, Kandlakoya, Hyderabad, Telangana

INTERNAL COMPLAINTS COMMITTEE (ICC)

DRILS continues to be committed to a zero-tolerance policy with regard to inappropriate conduct at the workplace. The committee met to satisfy the statutory requirements and noted no major incidents.

HUMAN RESOURCE AND DEVELOPMENT AND FINANCE

DRILS is supported by an efficient administrative team consisting of HR, Finance, Purchase, IT, Engineering and Maintenance departments in addition to the three scientific Centres.

Staff engaged in R & D activities	
On-roll employees	83
Consultants	10
Industry sponsored fellowship	10
Grant based fellowship	14
Ph.D Scholars	7
Trainees / Interns	62
Staff engaged in non-R & D activities	
Finance & accounts / Business Dev & Proj. Mgt	3
HR & admin	2
Purchase & stores	2
Maintenance & Engineering dept.	1
IT & communications	2
Electrical Dept.	1
TOTAL Staff	197