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Annual Report 2024-25

CSIR-Central Drug Research Institute

Fundamental Science
Driven Innovation

csir.cdri | www.cdri.res.in | director@cdri.res.in

Editorial Board

Acknowledgement

Editorial board sincerely thanks and acknowledges all those who have extended their generous support, advice and help in the preparation of the Annual Report 2024-25. We are grateful to all the Area Coordinators and Heads/ In Charge of Divisions/ Units, Administration for the timely submission of inputs and for the support.

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वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद
CSIR-INDIA
सीएसआईआर
CSIR
भारत का नवाचार इंजन
The Innovation Engine of India

ANNUAL REPORT
2024-25

CSIR-Central Drug Research Institute

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Organizational Structure

Shri Narendra Modi
Hon'ble Prime Minister
President, CSIR

Dr. Jitendra Singh
Hon'ble Minister of State for S&T
Vice President, CSIR

Dr. N. Kalaiselvi
Secretary, DSIR & Director General, CSIR

Research Council → **Dr. Radha Rangarajan**
Director, CSIR-CDRI ← **Management Council**

State of the Art Facilities

- Common Research and Technology Development Hub
- GLP Test Facility for Pharmaceuticals
- National Laboratory Animal Facility
- Sophisticated Analytical Instrument Facility
- National Repository of Small Organic Compounds
- Medicinal Plant Herbarium Facility
- Knowledge Resource Centre

S&T Management Groups

- Scientific Directorate
- Business Development and Intellectual Property
- Human Resource Development

ICT & Infrastructure Management

- Computer Centre
- Centralized Utility Services
- Instrumentation
- Auditorium
- Laboratory Engineering Services

R&D Divisions

1. **Biochemistry & Structural Biology**
2. **Cancer Biology**
3. **Endocrinology**
4. **Medicinal and Process Chemistry**
5. **Molecular Microbiology & Immunology**
6. **Neuroscience and Ageing Biology**
7. **Pharmaceutics & Pharmacokinetics**
8. **Pharmacology**
9. **Toxicology & Experimental Medicine**
10. **Virus Research & Therapeutics**
11. **Sophisticated Analytical Instrument Facility and Research**
12. **National Laboratory Animal Centre**

General Administration and Facilities

- Administration
- Accounts
- Stores & Purchase
- CSIR Dispensary
- Canteen

Field Station

- CDRI Clinical Pharmacology Unit, Seth G.S. Medical College, Mumbai
- KGMU, Lucknow
- PGIMER, Chandigarh

Contents

Vision

To drive discovery and development of cutting edge and affordable healthcare technologies

CSIR-INDIA
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CSIR
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The Innovation Engine of India

CSIR-Central Drug Research Institute

Mission

Discovery and development of therapeutics for nationally important diseases with global impact, understanding fundamental disease biology and training future drug researchers

Mandate

- ✓ To discover and develop new drugs in the area of national priorities with a futuristic vision
- ✓ To systematically explore natural resources for therapeutic potential, and development of phytopharmaceuticals / botanicals
- ✓ To serve as a national nodal center for drug discovery and pre-clinical development to translate 'leads' to 'candidate drugs'
- ✓ To provide co-working platforms, process technologies and consultancy to the healthcare industry
- ✓ To conduct cutting-edge research in disease biology to identify novel druggable targets and pathways
- ✓ To develop biotherapeutics for diseases of national importance
- ✓ To develop novel disease markers and diagnostics
- ✓ To protect traditional knowledge (intellectual property) and disseminate new knowledge
- ✓ To develop globally employable human resource specializing in diverse areas of drug discovery and development

Director's Message

It is an honour and a privilege to present CSIR-CDRI's Annual Report for the financial year 2024-25. Established in 1951, the Institute has now entered its 75th year, with a rich history of dedication to public health. The institute's mission is to engage in fundamental and translational research in the quest for novel drugs, diagnostics and process technologies in disease areas of national relevance. I will reflect on key highlights of the past year.

Licensing agreements

We signed an agreement with Themis Medicare Limited, Mumbai for the manufacture and sale of a standardized fraction of *Picrorhiza kurroa* for Non-alcoholic fatty liver disease. The product has been developed in collaboration with CSIR-IHBT and is currently being evaluated with funding support from ICMR and CSIR in multi-centric phase 3 clinical trials. If the trial meets its primary end points, Themis Medicare will seek marketing authorization to commercialize the drug. If approved, this drug would be the first phytopharmaceutical drug to be approved based on CDSCO's phytopharmaceutical rules (2015).

A second licensing agreement was signed with MyLab Discovery Solutions Pvt. Ltd., Pune. The CSIR-CDRI team together with a team from KGMU has developed a novel set of primers and probes to enable the detection of Dengue, Zika and Chikungunya together with MyLab's primers and probes for the dengue virus. The kit addresses the need to identify pathogens for diseases with overlapping symptoms, with one test. The technology transfer for the kit has been completed.

Translational pipeline

Our translational pipeline has 5 compounds which continue to progress. S-011-1793 for malaria and S-016-1348 for colon and other solid tumors have completed Regulatory toxicity studies in the rodent and are poised for toxicity studies in the dog. CDRI4-105, an advanced lead for neuropathic pain is now being developed as a subcutaneous injectable formulation, based on a detailed understanding of its pharmacokinetics. GS/IICT5-6 has been pivoted for age dependent macular degeneration. S-019-0277 is being pursued for Filaria but significant effort will be required to understand its complex mechanism of action. S017-622 for dyslipidemia was terminated.

Among the phytopharmaceutical leads, a majority of the Regulatory studies for standardized, enriched fractions of Chebulinic acid and *Withania somnifera* root have been completed. A pivotal toxicity study for *Withania somnifera* leaf extract is on-going. An enriched extract of fenugreek is in lead optimization for Polycystic Ovarian Syndrome.

Overview of research programs

As a translational research institute, we are well aware that high quality drugs emerge from a bedrock of high quality research. I am delighted to share that in the last year, we ran 205 research projects distributed across our 8 thrust areas. They covered diverse topics such as elucidating the aetiology of disease, its progression, identification and characterisation of putative targets for drugs, diagnostics and vaccines.

(i) CSIR funded programs

We are currently contributing to 5 CSIR Mission Mode projects and 4 Headquarter Controlled projects, out of which we lead 3.

The first is the PAN-Cancer Mission focused on dual goals of identifying novel drug candidates (NCEs) and developing new processes for high value drugs for Triple negative breast cancer and ovarian cancer. This mission is now completing its fourth year with impressive outcomes: 1 candidate compound in Regulatory studies, 2 (Olaparib & Palbociclib) processes developed, multiple lead compounds, 12 Patents filed and close to 20 publications.

We are also leading a multi-institutional effort to understand and validate neuroinflammatory targets driving neuropathic pain, neuronal regeneration, senescence and degenerative diseases.

The third Mission project is in the area of Antimicrobial Resistance where the focus is on identifying novel hits and leads, developing new delivery systems, elucidating novel mechanisms of action and establishing new methods for surveillance in the community.

(ii) Extramural projects

We are involved in several multi-institutional initiatives with funding from non-CSIR resources. These include a Centre for Marine Therapeutics from the Department of Pharmaceuticals, a Centre of Advanced Research for AMR from ICMR, a Centre of Excellence in AMR from DST and a drug discovery project under the Deep Ocean Mission of the Ministry of Earth Sciences. We continue to work on a project funded by the Gates Foundation to validate non hormonal targets for contraception in collaboration with partners across the Foundation's ecosystem.

Amongst the newly funded projects, we are privileged to receive a Grant from BFI Biome, a private biomedical fund that is dedicated to supporting translational research. This Grant for 3 years will support the IND enabling studies for S-011-1793, lead optimization of Adiponectin receptor agonists for skeletal muscle atrophy, identification of leads against the dengue virus and lead optimization of CDRI4-105.

(iii) Publications and patents

A total of **266** publications were published with an average impact factor of **4.93**. Of these, **13** publications were in journals with an impact factor above **10**.

A total of **16** patents were filed abroad and **7** applications in India in the reporting period. During year, **2** Indian patents were granted by the authority.

Institutional highlights

(i) Awards

Several individual awards were won in the past year for scientific achievements. This includes 12 for faculty and 53 for students.

At the organizational level, ICMR recognized CSIR-CDRI for research excellence in the Best Extramural Institute category in November 2024. The award recognizes the impact of the work of CSIR-CDRI scientists in the biomedical arena.

A second award that is noteworthy is from the Confederation of Indian Industry, CII. We were recognized as an Institution of excellence for Women in STEM.

(ii) Events

The past year was witness to several high impact scientific events.

A Drug Discovery workshop was organized jointly by the Wellcome Centre for Anti Infectives Research (WCAIR), University of Dundee, UK and CSIR-CDRI, 2024 with participants from academia and industry and faculty from WCAIR, University of Dundee, and CSIR-CDRI. The goal was to teach the fundamental principles of drug discovery with a focus on assay development, medicinal chemistry and pharmacokinetics.

The 9th International Conference on Current Trends in Drug Discovery Research (**CTDDR-2025**) was held from 19-22 February 2025. This conference series initiated in 2001, is held once every 3 years at CSIR-CDRI with the goal of bringing together researchers from India and across the world to learn about cutting edge research related to the

discovery and development of drugs. The conference featured over 40 oral presentations, 24 flash talks and more than 300 poster presentations. Speakers come from academia and industry and from 8 countries. There were more than 650 participants in attendance, of which 440 were students.

One Week One Theme (**OWOT**), an initiative of the Hon'ble Minister of Science and Technology, Dr Jitendra Singh, was marked at CSIR-CDRI on November 13, with multiple scientific sessions focused on India's R&D priorities for affordable healthcare. Shri Partha Sen Sharma, Principal Secretary, Medical Health and Family welfare, Uttar Pradesh, Dr. Sonia Nityanand, and Vice Chancellor of KGMU graciously inaugurated the event. Participation by students from Pharmacy colleges and Medical schools in the Lucknow area made the event particularly meaningful.

Human Resource Development

(i) PhD Program

During the year 2024-25, 79 research scholars joined the Institute and 91 research scholars submitted their PhD thesis.

(ii) Skill Development Programs

The Skill Development Program (Healthcare & Life science) at our Institute is a pioneering initiative aimed at equipping India's youth with the practical skills and exposure needed to thrive in a rapidly evolving professional landscape. In the 2024–2025 cycle, the program engaged 279 participants through 13 specialized training modules, demonstrating significant outreach and diversity.

(iii) Scientific Social Responsibilities

During the annual period from 1st April 2024 to 31st March 2025, we organized a total of 106 Science Outreach programs, including the flagship Students-Scientist Connect Program under the Jigyasa, aimed at fostering scientific awareness and public engagement across diverse communities. These programs benefitted more than 10,000 students, 2500 faculty and 18,000 members of the lay public.

Budget and financial resources

We are grateful for the support from CSIR under the regular budget heads for the last financial year. In addition, the Institute generated Rs. 96.71 Crore of ECF and added 3.74 Crore to the lab reserves. The Institute's lab reserve fund increased by 16% during the year.

Future plans

As we progress towards the completion of 75 years as an Institute, we must consolidate and build on our legacy as a drug discovery institute. This means that our fundamental research must generate translational ideas, the preclinical pipeline must be robust and compounds must seamlessly progress from preclinical to clinical stages. To achieve these goals, we need consistent funding, focused partnerships, a well-trained student pool and technical workforce and a prudent approach to new technologies. (i) On the funding side, internal project based funding for basic and translational research is streamlined. It has allowed scientists to establish the initial proof-of-concept so that external funding can then be sought. Beyond extramural funding from Government agencies, we need to identify alternate sources, particularly for funding Regulatory studies. (ii) We have forged collaborations with a number of Indian institutions but global collaborations continue to be difficult to establish. This is necessary for us to remain globally competitive. (iii) We recognize that our students play a key role in ensuring excellence in research. Thus, we must ensure that the quality of training is of the highest standard. Further, Technical officers, who are involved in research, need to be better integrated into ongoing programs. (iv) Finally, our embrace and use of technology is essential. This is one of the ways in which we may be able to reduce cost and improve efficiency of drug discovery. We need to continuously adopt new technologies, either through strategic collaborations or by recruiting scientists with the appropriate skill set.

Gratitude

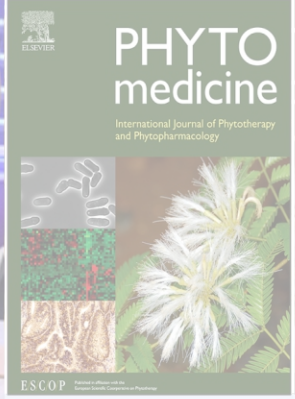
I sincerely thank all the faculty, staff and students of CSIR-CDRI for their dedicated and sustained efforts in support of the Institute's mandate. I am deeply grateful to the Research Council members for their guidance and inputs into our programs. I also acknowledge the vital support of the various funding agencies. Last but not the least, we greatly value our partnerships with start-ups, industry, clinical and academic partners.

-Radha Rangarajan


74th ANNUAL DAY CELEBRATIONS
CSIR- Central Drug Research Institute, Lucknow

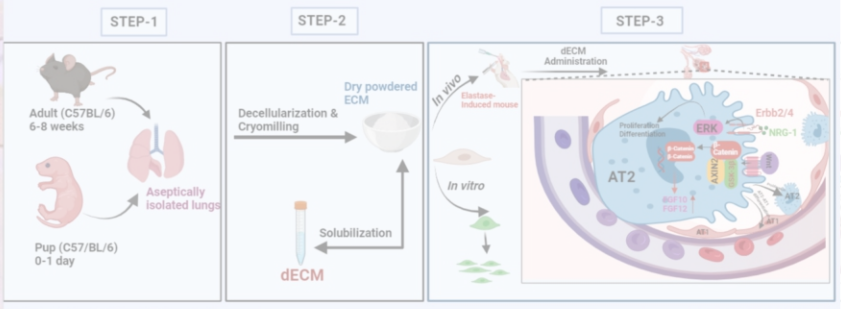
Executive Summary and R&D Highlights

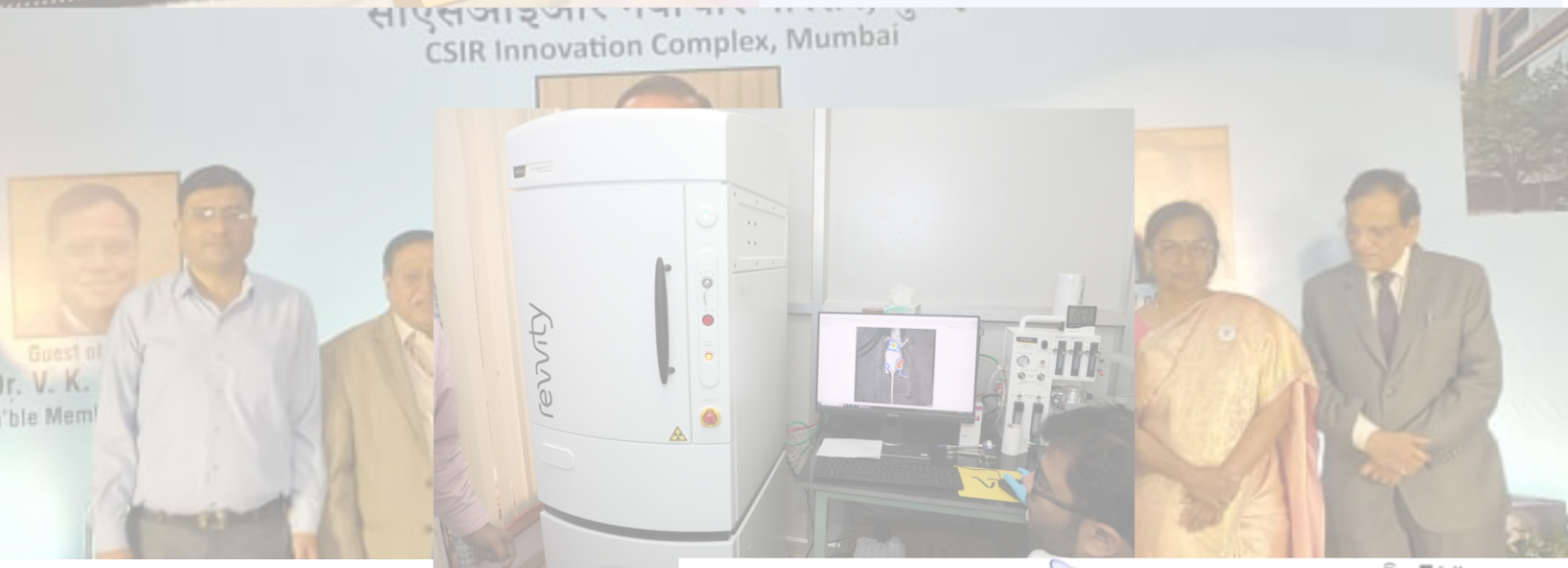

CII
Confederation of Indian Industry
CII Awards on Excellence for Women in STEM
This is to certify that
CSIR-Central Drug Research Institute, Lucknow
is recognised as one of the top institutions excelling in Women in STEM
2024
Dr. Ashish Mohan
Executive Director
Technology, R&D, IP & Innovation and Design
Confederation of Indian Industry
Ms. Vaishali Nigam Sinha
Chairperson
CII Awards on Excellence for Women in STEM 2024
CSIR-Central Drug Research Institute, Lucknow
Top Institution Excelling in Women in STEM
2024


ELSEVIER
PHYTO
medicine
International Journal of Phytotherapy and Phytopharmacology
ESCOP


Leukemia
SPRINGER NATURE


Nucleic Acids Research
OXFORD
UNIVERSITY PRESS


STEP-1
STEP-2
STEP-3
Adult (C57BL/6)
6-8 weeks
Aseptically isolated lungs
Pup (C57/BL/6)
0-1 day
Decellularization & Cryomilling
Dry powdered ECM
Solubilization
dECM
In vivo
dECM Administration
Elastase-Induced mouse
In vitro
AT2
ERK
Erbb2/4
NRG-1
Proliferation
Differentiation


CSIR Innovation Complex, Mumbai
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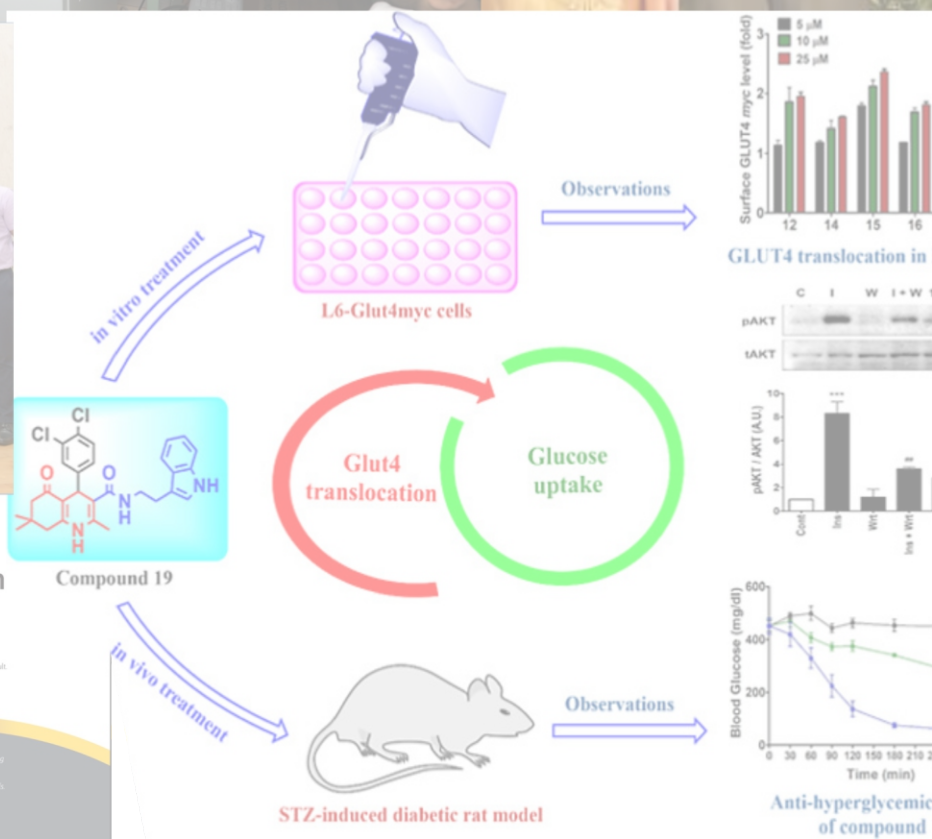
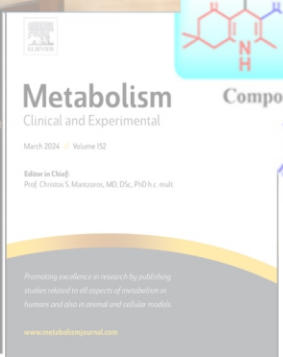
Research Collaboration
Agreement Signing Ceremony
zydus


in vitro treatment
L6-Glut4myc cells
Observations
Surface GLUT4 myc level (fold)
5 μM
10 μM
25 μM
GLUT4 translocation in
C
I
W
I + W
pAKT
tAKT
pAKT / AKT (A.U.)
Cont
Ins
Wt
Ins + Wt
Cl
Cl
O
O
NH
N
H
Compound 19
Glut4 translocation
Glucose uptake
in vivo treatment
STZ-induced diabetic rat model
Observations
Blood Glucose (mg/dl)
Time (min)
Anti-hyperglycemic
of compound


Journal of
Medicinal
Chemistry
ACS Publications


PNAS
Proceedings of the National Academy of Sciences of the United States of America


Metabolism
Clinical and Experimental
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Volume 152
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Prof. Christos S. Mantzoros, MD, DSc, PhD h.c. mult.
Promoting excellence in research by publishing studies related to all aspects of metabolism in humans and also in animal and cellular models.
www.metabolismjournal.com

Highlights of Achievements 2024-25

Products & Technologies		
Technology Transfer/Licensing	:	• A Standardized Fraction of *Picrorhiza kurroa* for the Treatment of Non-Alcoholic Fatty Liver Disease (NAFLD) Licensed to Themis Medicare Limited, Mumbai on 17-01-2025 • TaqMan-like Probe Based RT-PCR Detection Kit for Arboviral Infections (Dengue, Chikungunya, Zika) Transferred to Mylab Discovery Solutions Private Limited, Pune on 17-01-2025
Candidate Drugs under Clinical Trial	:	• Umifenovir (Anti-viral) in Phase III • Picroliv (Treatment of NAFLD) in Phase III • S007-1500 (Fracture healing) in Phase I • S007-867 (Anti-thrombotic) in Phase I • Centinhale (Anti-tubercular) in Phase I (academic) • L-Ormeloxifene (Contraception)
Publications in SCI Journals		
Total Number	:	266
Average Impact Factor	:	4.93
Publication with >10 Impact Factor	:	13
Publications with >5 Impact Factor	:	66
Patents		
Filed in India	:	07
Filed Abroad	:	16
Granted in India	:	02
Human Resource Development		
Ph.D. Thesis Submitted	:	91
Post-graduate / Skill Trainees	:	279
New Projects		
Grant-in-Aid & Sponsored Projects Initiated	:	31
Total Approved Cost of the Grant-in-Aid & Sponsored Projects Initiated (ECF)	:	Rs. 98.306 Crore

Therapeutic Research Areas

- Microbial Infections
- Viral Infections
- Parasitic Infections
- Cancer
- Neurological Disorders
- Metabolic Disorders
- Musculoskeletal Health and Disorders
- Reproductive Health

Activity Portfolio

Discovery & Development

- Drugs
- Indigenous Process Technologies
- Diagnostics

Fundamental Research

- Disease Biology in the Areas of National Importance
- Chemistry

Human Resource Development

- Doctoral and Post-Doctoral Training
- Post-graduate Training and Skill Development

Scientific and Technical Services

- CRTDH – Drug Testing Lab
- GLP Test Facility
- Biological Screening
- Sophisticated Analytical Instruments

Product Pipeline

Small Molecules

Small molecule	Indication	Lead Optimization	IND Enabling Studies	IND Filed	Phase I Clinical	Phase II Clinical	Phase III Clinical
Umifenovir (Licensed)	COVID-19						
S-007-1500 (Licensed)	Fracture Healing						
L-Ormeloxifene (Licensed)	Female Contraceptive						
S-007-867	Thrombosis						
S-011-1793	Malaria						
S-016-1348	Cancer						
SB-CDRI4-105	Chemotherapy Induced Neuropathic Pain						
S-016-1271	Complicated UTI						
S-019-0277	Lymphatic Filariasis						

Phytopharmaceuticals

Phytolead	Indication	Lead Optimization	IND Enabling Studies	IND Filed	Phase I Clinical	Phase II Clinical	Phase III Clinical
Picroliv (Licensed)	Non-Alcoholic Fatty Liver Disease						
NMITLI -118 AF1	Stroke						
Chebulinic Acid Enriched Fraction (Licensed)	Benign Prostatic Hyperplasia						
NMITLI -118 WFA (Co-development with industry)	Bone Health						
1703F003 4-HIL	Polycystic Ovary Syndrome						

Novel Formulations

Formulation	API	Indication	Lead Optimization	Subsequent New Drug Application	Phase I Clinical	Phase II Clinical	Phase III Clinical
Centinhale (Dry Powder Formulation)	Rifabutin and Isoniazid	MDR TB					
Ophthalmic Formulation (Licensed)	Amphotericin	Fungal Keratitis					

Breakthrough Achievement in 2024-25

Licensing of Technology

A Standardized Fraction of *Picrorhiza kurroa* for the Treatment of Non Alcoholic Fatty Liver Disease (NAFLD) Licensed to Themis Medicare Limited, Mumbai on 17 January 2025

The non-alcoholic fatty liver disease is silent epidemic in India with incidence of 9-39%. To date, there are very few FDA approved orally active drugs available for NAFLD.

Research team from the CSIR-CDRI, Lucknow and CSIR-IHBT, Palampur has standardized the candidate drug, Picroliv derived from the plant *Picrorhiza kurrooa*, also known as Kutki. This plant grows in the Himalayan region of northwest India. CSIR-IHBT has developed the high-yielding varieties and cultivation techniques for *Picrorhiza kurrooa* and also standardised the extraction process. CSIR-CDRI has established the pre-clinical efficacy and safety in various regulatory animal model systems. Currently, CSIR-CDRI is coordinating the clinical trial at 6 medical institutions with budgetary support from the ICMR and CSIR.

Photo: Licensing agreement executed with Themis Medicare Limited, Mumbai on 17 Jan 2025
(L to R): Dr. Vivek V. Bhosale, Principal Scientist, Dr. Vijay Kumar Saraswat, Eminent Scientist, Dr. Naseem A Siddiqui, Head, Business Development, CSIR-CDRI, Mr. Manoj Rathod, Themis Medicare, Dr. Radha Rangarajan, Director, CSIR-CDRI, Dr. N. Kalaiselvi, Secretary DSIR & DG, CSIR and Dr. Vinod Paul, Member, Niti Ayog

Technology development team, CSIR-CDRI

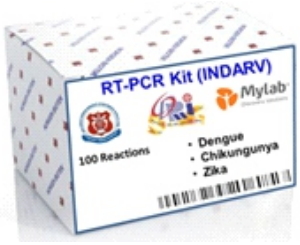
First Row (L to R): Dr. Naseem A Siddiqui, Dr. Shail Singh, Dr. Vivek V. Bhosale, Dr. Radha Rangarajan, Dr. S. K. Rath, Dr. K. V. Sashidhara, Dr. Kumaravelu Jagavelu, Dr. D. P. Mishra. Dr. Manish Chourasia, Dr. Sharad Sharma

Second Row (L to R): Ms. Kajal, Mr. Pankaj Shukla, Dr. S. P. Singh, Mr. Abhishek Nirwan, Mr. Naresh Kothuri, Mr. Sanjay Singh, Mr. Deepanshu Sidhwani

Breakthrough Achievement in 2024-25

Transfer of Technology

TaqMan-like Probe Based RT-PCR Detection Kit for Arboviral Infections (Dengue, Chikungunya, Zika) Transferred to M/s Mylab Discovery Solutions Private Limited (MDSPL), Pune, India on CSIR-CDRI Foundation Day, 17 February 2025 for Commercialization



During post-monsoon season, there is an increased emergence of arboviral infections and co-infection(s) such as Dengue, Chikungunya and Zika in Asia and Indian subcontinent. The current bottleneck in diagnosis is the cross-reactivity of antibodies leading to false negative results and individual tests are costly and time-consuming. Considering the unmet need, the CSIR-CDRI team has developed TaqMan-like probe-based RT-PCR kit, a cost-effective and reliable diagnostic for detection of Dengue, Chikungunya and Zika, simultaneously.

Photo: Licensing of CDRI Technology to M/S Mylab Discovery Solutions Private Limited (MDSPL), Pune on 17 January 2025

(From Left): Mr. Rajarshi Dey, MDSPL, Dr. Vivek V Bhosale, Principal Scientist, Dr. Niti Kumar, Principal Scientist, Dr. Ashish Arora, Senior Scientist, Dr. Vijay Kumar Saraswat, Eminent Scientist & Member, Niti Ayog, Dr. Naseem Ahmed Siddiqui, Head, Business Development, Dr. Shrikant Patole, MDSPL, Dr. Makhan Kumar, MDSPL, Dr. Atul Goel, Chief Scientist, Dr. Radha Rangarajan, Director, Dr. N. Kalaiselvi, DG, CSIR & Secretary, DSIR, Dr. Vinod Paul, Member, Niti Ayog

Technology development team, CSIR-CDRI

First Row (L to R): Mr. Vikash Yadav, Ms. Romya Pandey, Ms. Aradhana Singh, Ms. Nirupa Chourasia, Ms. Seema Vidyarthi

Second Row (L to R): Dr. Atul Goel, Dr. Radha Rangarajan, Director, CSIR-CDRI, Dr. Niti Kumar, Dr. Ashish Arora

Some Important Publications - 2024

Life Sciences

SN	Article Title	Author Names	Journal, Year, Volume (Issue), Page Numbers	IF
1	A Plasmodium Apicoplast-Targeted Unique Exonuclease/FEN Exhibits Interspecies Functional Differences Attributable to an Insertion that Alters DNA-Binding	Chatterjee T, Tiwari A, Gupta R, Shukla H, Varshney A, Mishra S and Habib S.	**Nucleic Acids Research,** 2024, 52(13), 7843-7862	16.6
2	Bacterial Rps3 Counters Oxidative and UV Stress by Recognizing and Processing AP-Sites on mRNA via a Novel Mechanism	Afsar M, Shukla A, Ali F, Maurya RK, Bharti S, Kumar N, Sadik M, Chandra S, Rahil H, Kumar S, Ansari I, Jahan F, Habib S, Hussain T, Krishnan MY and Ramachandran R.	**Nucleic Acids Research,** 2024, 52(22), 13996 14012	16.6
3	Targeting CERS6-AS1/FGFR1 Axis as Synthetic Vulnerability to Constrain Stromal Cells Supported Proliferation in Mantle cell Lymphoma	Jindal U, Mamgain M, Nath UK, Sharma I, Pant B, Sharma A, Gupta A, Rahman K, Yadav S, Singh MP, Mishra S, Chaturvedi CP, Courty J, Singh N, Gupta S, Kumar S, Verma SP, Mallick S, Gogia A, Raghav S, Sarkar J, Srivastava KR, Datta D and Jain N.	**Leukemia,** 2024, 38(10), 2196-2209	12.8
4	Cooperative STAT3 -NFkB Signalling Modulates Mitochondrial Dysfunction and Metabolic Profiling in Hepatocellular Carcinoma	Ishteyaque S, Singh G, Yadav KS, Verma S, Sharma RK, Sen S, Srivastava AK, Mitra K, Lahiri A, Bawankule DU, Rath SK, Kumar D and Mugale MN.	**Metabolism-Clinical and Experimental,** 2024, 152	10.8
5	Alendronate-Functionalized Porous Nano-Crystalsomes Mitigate Osteolysis and Consequent Inhibition of Tumor Growth in a Tibia-Induced Metastasis Model	Shukla RP, Tiwari P, Sardar A, Urandur S, Gautam S, Marwaha D, Tripathi AK, Rai N, Trivedi R and Mishra PR.	**Journal of Controlled Release,** 2024, 372, 331-346	10.5
6	Dacarbazine-Primed Carbon Quantum dots Coated with Breast Cancer cell-Derived Exosomes for Improved Breast Cancer Therapy	Tiwari P, Shukla RP, Yadav K, Singh N, Marwaha D, Gautam S, Bakshi AK, Rai N, Kumar A, Sharma D and Mishra PR.	**Journal of Controlled Release,** 2024, 365, 43-59	10.5
7	Regeneration Capability of Neonatal Lung-Derived Decellularized Extracellular Matrix in an Emphysema Model	Devi K, Tomar MS, Barsain M, Shrivastava A and Moharana B.	**Journal of Controlled Release,** 2024, 372, 234-250	10.5
8	ACSL4-Mediated H3K9 and H3K27 Hyperacetylation Upregulates SNAIL to Drive TNBC Metastasis	Sinha A, Saini KK, Chandramouli A, Tripathi K, Khan MA, Satrusal SR, Verma A, Mandal B, Rai P, Meena S, Nengroo MA, Singh MP, Bhushan NS, Vasudevan M, Singhai A, Singh K, Mishra AK, Kamat SS and Datta D.	**Proceedings of the National Academy of Sciences of the United States of America,** 2024, 121(52), e2408049121	9.4

Some Important Publications - 2024

Chemical Sciences

SN	Article Title	Author Names	Journal, Year, Volume (Issue), Page Numbers	IF
1	Corannulene Amino Acid-Derived Water-Soluble Amphiphilic Buckybowls as Broad-Spectrum Membrane Targeting Antibacterial Agents	Maji S, Akhtar S, Halder S, Chatterjee I, Verma DP, Verma NK, Saroj J, Saxena D, Maitra R, Sharma J, Sharma B, Sakurai H, Mitra K, Chopra S, Ghosh JK and Panda G.	**Journal of Medicinal Chemistry,** 2024, 67(17), 15041-15060	6.8
2	Design, Synthesis, and Biological Evaluation of 1,4-Dihydropyridine-Indole as a Potential Antidiabetic Agent via GLUT4 Translocation Stimulation	Katiyar S, Ahmad S, Kumar A, Ansari A, Bisen AC, Ahmad I, Gulzar F, Bhatta RS, Tamrakar AK and Sashidhara KV.	**Journal of Medicinal Chemistry,** 2024, 67(14), 11957-11974	6.8
3	Generating a Peptide Library Using the Repeats of Amino Acid Scaffolds Created by Sliding the Framework of a 7-mer Human Chemerin Segment and Discovery of Potent Antibacterial and Antimycobacterial Peptides	Akhtar S, Ansari MM, Verma RD, Sharma J, Gupta A, Dhuriya RK, Verma DP, Saroj J, Ali M, Verma NK, Mitra K, Singh BN and Ghosh JK.	**Journal of Medicinal Chemistry,** 2024, 68(1), 566-589	6.8
4	Androsin Alleviates Non-Alcoholic Fatty Liver Disease by Activating Autophagy and Attenuating *de novo* Lipogenesis	Singh A, Ansari A, Gupta J, Singh H, Jagavelu K and Sashidhara KV.	**Phytomedicine,** 2024, 129	6.7
5	Polycyclic Pyrazoles from Alkynyl Cyclohexadienones and Nonstabilized Diazoalkanes via [3 + 2]-Cycloaddition/[1,5]-Sigmatropic Rearrangement/Aza-Michael Reaction Cascade	Patel RK, Jha P, Chauhan A, Kant R and Kumar R.	**Organic Letters,** 2024, 26(4), 839-844	4.9
6	Anion-Relay Double Aza-Michael-Michael Cascades to Enone-Tethered Cyclohexadienones: Access to an Intricate Bridged Ring System	Chauhan A, Patel RK, Yadav A, Kant R and Kumar R.	**Organic Letters,** 2024, 26(27), 5602-5608	4.9
7	p-TsOH-Mediated Intramolecular C2-Arylation on NH-Indoles: Access of 5,10-Dihydroindeno[1,2-b]indoles	Verma A, Kant R and Ghosh N.	**Organic Letters,** 2024, 26(32), 6814-6818	4.9
8	Enzyme-Catalyzed Regioselective Synthesis of 4-Hetero-Functionalized 1,5-Disubstituted 1,2,3-Triazoles	Kumar N and Kumar A.	**Organic Letters,** 2024, 26(36), 7514-7519	4.9
9	BF(3)-Mediated C2-Amidation of Quinoline N-Oxides Employing Trifluorodiazoethane and Acetonitrile: Access to 2-N-(Trifluoroethyl)amidoquinolines	Dhami A, Chandrasekharan SP and Mohanan K.	**Organic Letters,** 2024, 27(1), 80-85	4.9

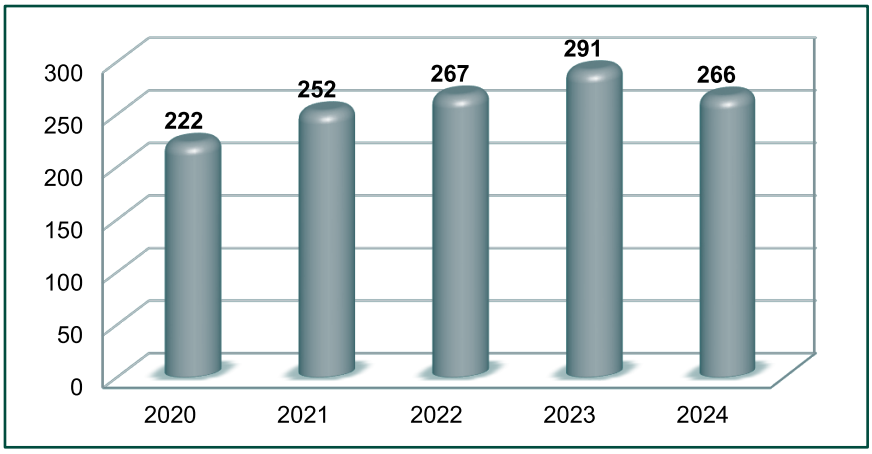
Some Important Publications - 2024

Collaborative Research & Review Articles

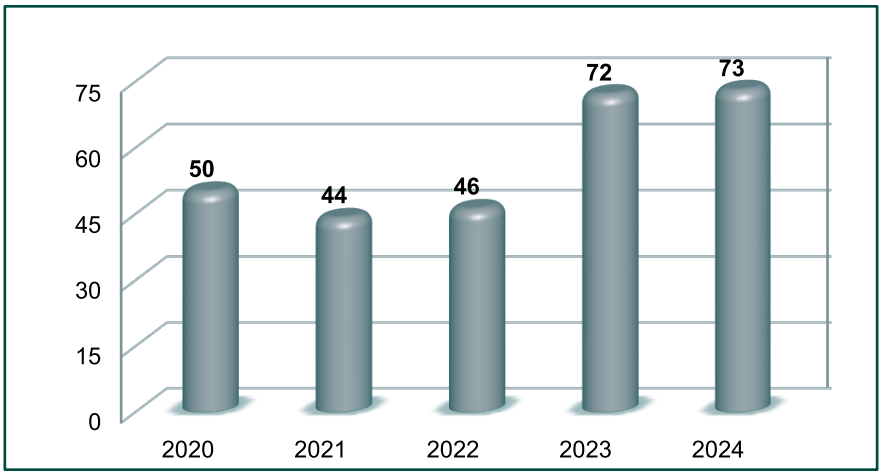
SN	Article Title	Author Names	Journal, Year, Volume (Issue), Page Numbers	IF
1	Expanding Antibiotic, Vaccine, and Diagnostics Development and Access to Tackle Antimicrobial Resistance	Laxminarayan R, Impalli I, **Rangarajan R**, Cohn J, Ramjeet K, Trainor BW , Strathdee S, Sumpradit N, Berman D, Wertheim H, Outterson K, Srikantiah P and Theuretzbacher U.	**The Lancet,** 2024, 403(10443), 2534-2550	98.4
2	Molecular Mechanism of Distinct Chemokine Engagement and Functional Divergence of the Human Duffy Antigen Receptor	Saha S, Khanppnavar B, Maharana J, Kim H, Carino CMC, Daly C, Houston S, Sharma S, Zaidi N, Dalal A, Mishra S, Ganguly M, Tiwari D, Kumari P, Jhingan GD, **Yadav PN**, Plouffe B, Inoue A, Chung KY, Banerjee R, Korkhov VM and Shukla AK.	**Cell,** 2024, 187(17), 4751-4769	45.5
3	Advances in Nanotherapeutic Strategies for Huntington's Disease: Design, Delivery, and Neuroprotective Mechanisms	Khan S, Bano N, Ahamad S, Dar NJ, **Nazir A** and Bhat SA.	**Coordination Chemistry Reviews,** 2024, 522	20.3
4	Ageing, Proteostasis, and the gut: Insights into Neurological Health and Disease	Akbar M, Toppo P and **Nazir A**.	**Ageing Research Reviews,** 2024, 101	12.5
5	Microglia and Gut Microbiota: A Double-Edged Sword in Alzheimer's Disease	Bano N, Khan S, Ahamad S, Kanshana JS, Dar NJ, Khan S, **Nazir A** and Bhat SA.	**Ageing Research Reviews,** 2024, 101	12.5
6	Strategies for Gaseous Neuromodulator Release in Chemical Neuroscience: Experimental Approaches and Translational Validation	Ali R, Sen S, Hameed R, **Nazir A** and Verma S.	**Journal of Controlled Release,** 2024, 365, 132-160	10.5
7	Emerging Role of EZH2 in Solid Tumor Metastasis	Verma A, Khan MA, Satrusal SR and **Datta D**.	**Biochimica et Biophysica Acta (BBA) - Reviews on Cancer,** 2024, 1880(1)	9.7
8	Biallelic Variants in CSMD1 are Implicated in a Neurodevelopmental Disorder with Intellectual Disability and Variable Cortical Malformations	Werren EA, Peirent ER, Jantti H, Guxholli A, **Srivastava KR**, Orenstein N, Narayanan V, Wiszniewski W, Dawidziuk M, Gawlinski P, Umair M, Khan A, Kha n SN, Geneviève D, Lehalle D, van Gassen KLI, Giltay JC, Oegema R, van Jaarsveld RH, Rafiullah R, Rappold GA, Rabin R, Pappas JG, Wheeler MM, Bamshad MJ, Tsan YC, Johnson MB, Keegan CE, Srivastava A and Bielas SL.	**Cell Death & Disease,** 2024, 15(5)	8.1
9	Altered Igf2 Imprint Leads to Accelerated Adipogenesis and Early Onset of Metabolic Syndrome in Male Mice Following Gestational Arsenic Exposure	Koshta K, Chauhan A, Singh S, **Gaikwad AN**, Kumar M and Srivastava V.	**Chemosphere,** 2024, 352	8.1

Measurable Performance

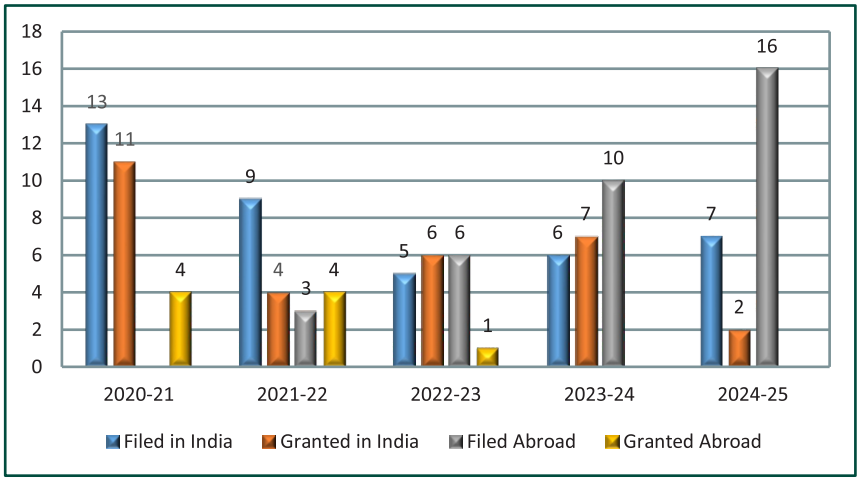
Research Publications



PhD Thesis Submission



Patents



*Data as on 01-04-2025

Research Highlights

A *Plasmodium* Apicoplast-Targeted Unique Exonuclease/FEN Exhibits Interspecies Functional Differences Attributable to an Insertion that alters DNA-Binding

Tribeni Chatterjee, Anupama Tiwari, Ritika Gupta, Himadri Shukla, Aastha Varshney, Satish Mishra and Saman Habib.

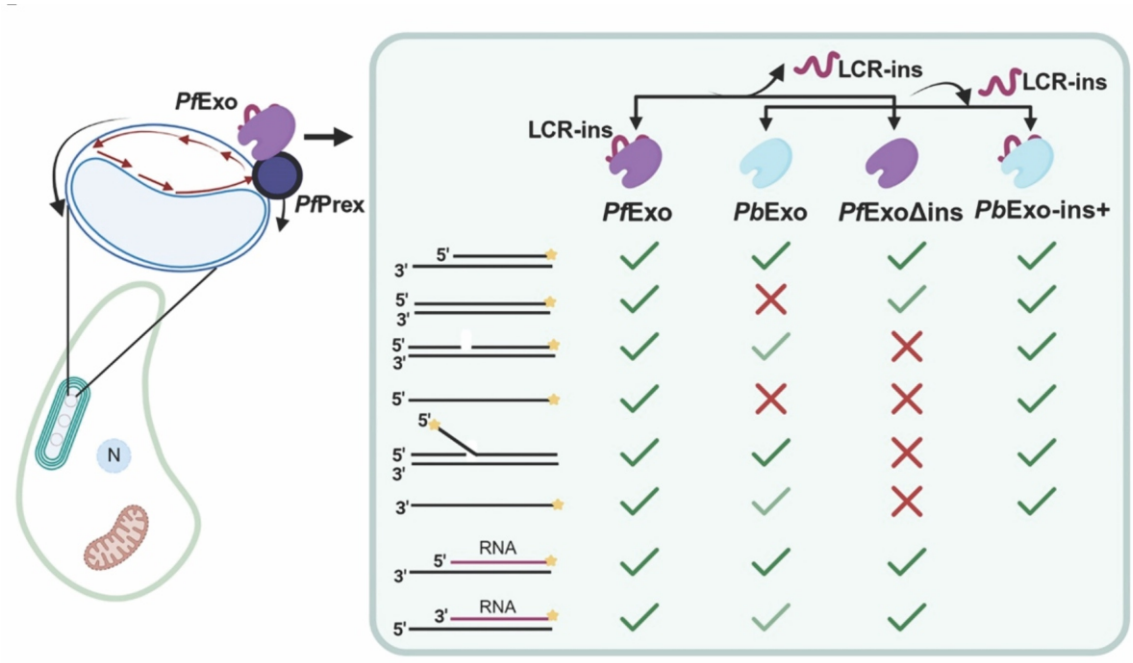
Nucleic Acids Research, 2024, 52(13), 7843-7862.

Tribeni Chatterjee

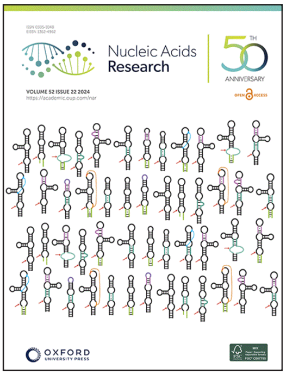
Anupama Tiwari

Dr. Saman Habib

The human malaria parasite *Plasmodium falciparum* genome is among the most A + T rich, with low complexity regions (LCRs) inserted in coding sequences including those for proteins targeted to its essential relict plastid (apicoplast). Replication of the apicoplast genome (plDNA), mediated by the atypical multifunctional DNA polymerase *Pf*Prex, would require additional enzymatic functions for lagging strand processing. We identified an apicoplast-targeted, [4Fe-4S]-containing, FEN/Exo (*Pf*Exo) with a long LCR insertion and detected its interaction with *Pf*Prex. Distinct from other known exonucleases across organisms, *Pf*Exo recognized a wide substrate range; it hydrolyzed 5'-flaps, processed dsDNA as a 5'-3' exonuclease, and was a bipolar nuclease on ssDNA and RNA-DNA hybrids. Comparison with the rodent *P. berghei* ortholog *Pb*Exo, which lacked the insertion and [4Fe-4S], revealed interspecies functional differences. The insertion-deleted *Pf*ExoΔins behaved like *Pb*Exo with a limited substrate repertoire because of compromised DNA binding. Introduction of the PfExo insertion into *Pb*Exo led to gain of activities that the latter initially lacked. Knock out of *Pb*Exo indicated essentiality of the enzyme for survival. Our results demonstrate the presence of a novel apicoplast exonuclease with a functional LCR that diversifies substrate recognition, and identify it as the candidate flap-endonuclease and RNaseH required for plDNA replication and maintenance.



Research Highlights



Bacterial Rps3 Counters Oxidative and UV Stress by Recognizing and Processing AP-Sites on mRNA via a Novel Mechanism

Mohammad Afsar, Ankita Shukla, Faiz Ali, Rahul Kumar Maurya, Suman Bharti, Nelam Kumar, Mohammad Sadik, Surabhi Chandra, Huma Rahil, Sanjay Kumar, Imran Ansari, Farheen Jahan, Saman Habib, Tanweer Hussain, Manju Yasoda Krishnan and Ravishankar Ramachandran

Nucleic Acids Research, 2024, 52(22),13996-14012.

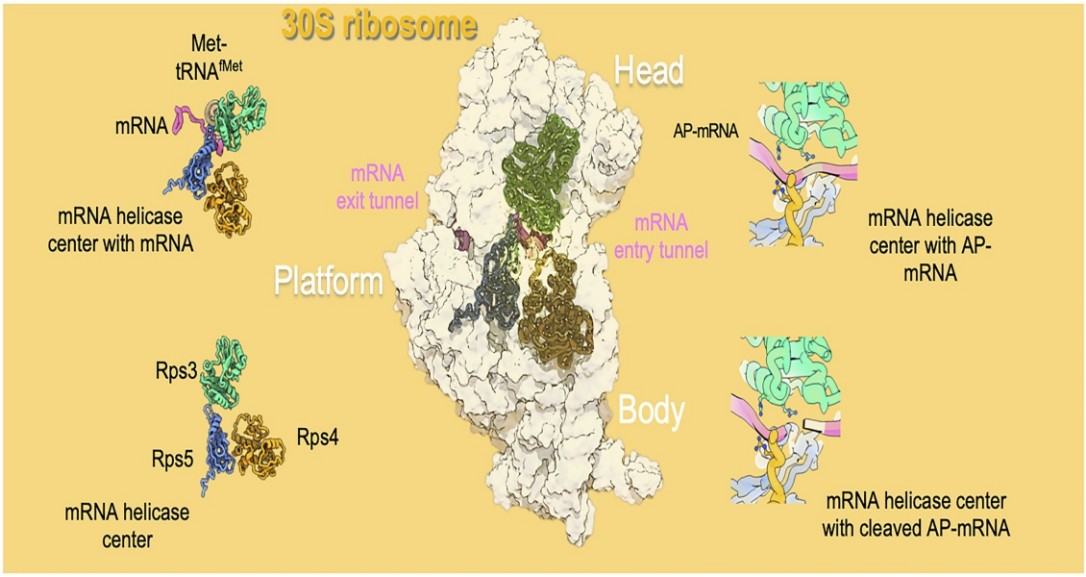
Mohammad Afsar

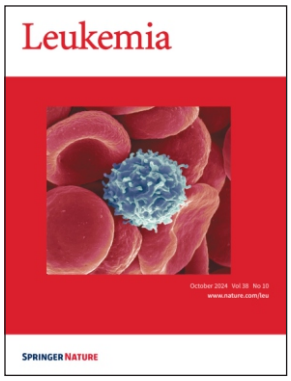
Ankita Shukla

Faiz Ali

Dr. R Ravishankar

Lesions and stable secondary structures in mRNA severely impact the translation efficiency, causing ribosome stalling and collisions. Prokaryotic ribosomal proteins Rps3, Rps4 and Rps5, located in the mRNA entry tunnel, form the mRNA helicase center and unwind stable mRNA secondary structures during translation. However, the mechanism underlying the detection of lesions on translating mRNA is unclear. We used Cryo-EM, biochemical assays, and knockdown experiments to investigate the apurinic/apyrimidinic (AP) endoribonuclease activity of bacterial ribosomes on AP-site containing mRNA. Our biochemical assays show that Rps3, specifically the ^{130}RR^{131} motif, is important for recognizing and performing the AP-endoribonuclease activity. Furthermore, structural analysis revealed cleaved mRNA product in the 30S ribosome entry tunnel. Additionally, knockdown studies in *Mycobacterium tuberculosis* confirmed the protective role of Rps3 against oxidative and UV stress. Overall, our results show that prokaryotic Rps3 recognizes and processes AP-sites on mRNA via a novel mechanism that is distinct from eukaryotes.





Research Highlights

Targeting CERS6-AS1/FGFR1 Axis as Synthetic Vulnerability to constrain Stromal Cells Supported Proliferation in Mantle Cell Lymphoma

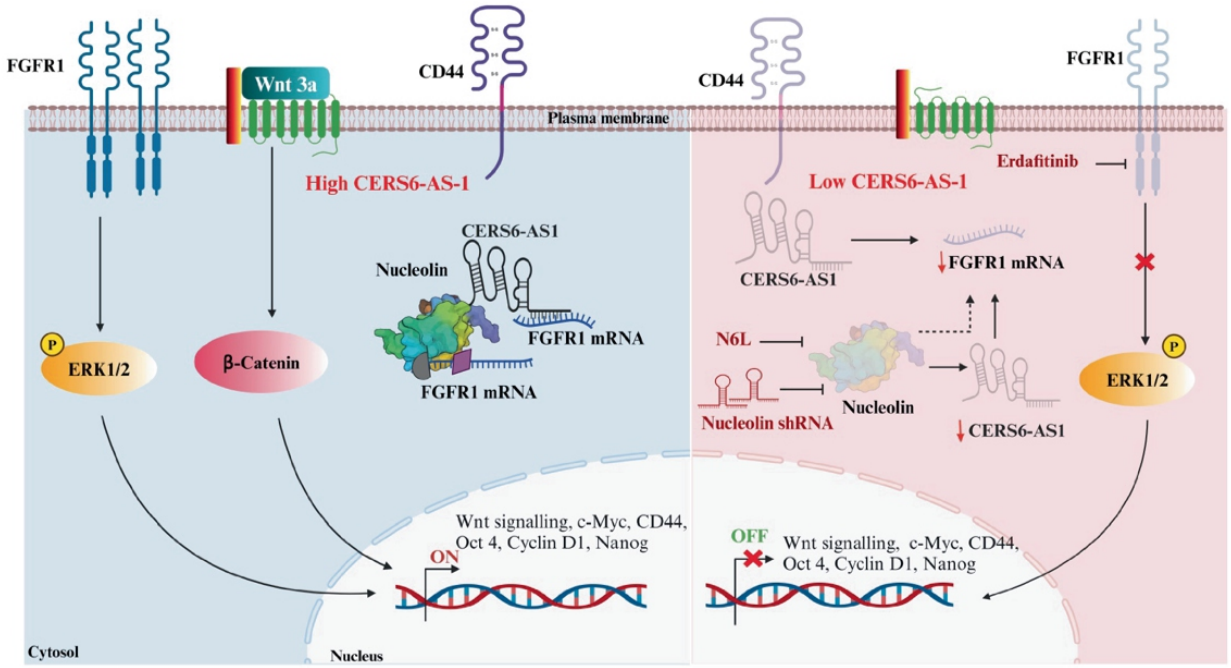
Udita Jindal, Mukesh Mamgain, Uttam Kumar Nath, Isha Sharma, Bhaskar Pant, Ankita Sharma, Archita Gupta, Khaliqur Rahman, Sunil Yadav, Manish Pratap Singh, Shaktiprasad Mishra, Chandra Praksah Chaturvedi, Jose Courty, Navin Singh, Seema Gupta, Sanjeev Kumar, Shailendra Prasad Verma, Saumyaranjan Mallick, Ajay Gogia, Sunil Raghav, Jayanta Sarkar, Kinshuk Raj Srivastava, Dipak Datta and Neeraj Jain.

Leukemia, 2024, 38(10), 2196-2209.

Udita Jindal

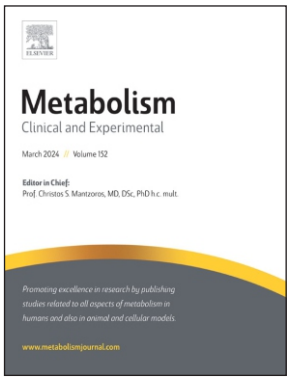
Dr. Neeraj Jain

The interaction between stromal and tumor cells in tumor microenvironment is a crucial factor in Mantle cell lymphoma (MCL) progression and therapy resistance. We have identified a long non-coding RNA, CERS6-AS1, upregulated in MCL and associated with poor overall survival. CERS6-AS1 expression was elevated in primary MCL within stromal microenvironment and in a subset of MCL cells adhered to stromal layer. These stromal-adhered MCL-subsets exhibited cancer stem cell signatures than suspension counterparts. Mechanistically, we found that downregulating CERS6-AS1 in MCL reduced Fibroblast Growth Factor Receptor-1 (FGFR1), expression attributed to loss of its interaction with RNA-binding protein nucleolin. In addition, using *in-silico* approach, we have discovered a direct interaction between nucleolin and 5'UTR of FGFR1, thereby regulating FGFR1 transcript stability. We discovered a positive association of CERS6-AS1 with cancer stem cell signatures, and Wnt signaling. Building on these, we explored potential therapeutic strategies where combining nucleolin-targeting agent with FGFR1 inhibition significantly contributed to reversing cancer stem cell signatures and abrogated primary MCL cell growth on stromal layer. These findings provide mechanistic insights into regulatory network involving CERS6-AS1, nucleolin, and FGFR1 axis-associated crosstalk between tumor cells and stromal cell interaction and highlights therapeutic potential of targeting a non-coding RNA in MCL.



Model showing the role of CERS6-AS1/FGFR1/nucleolin oncogenic regulating loop in MCL.

Research Highlights



Cooperative STAT3-NFkB Signaling Modulates Mitochondrial Dysfunction and Metabolic Profiling in Hepatocellular Carcinoma

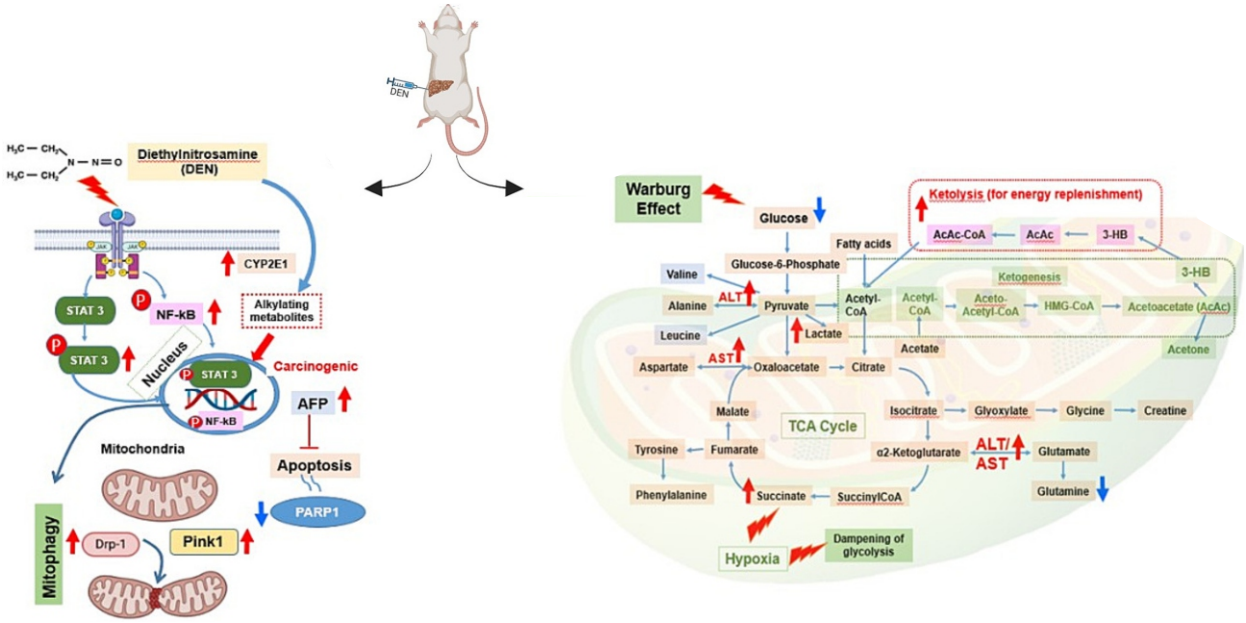
Sharmeen Ishteyaque, Gurvinder Singh, Karan Singh Yadav, Smriti Verma, Rakesh Kumar Sharma, Sumati Sen, Anurag Kumar Srivastava, Kalyan Mitra, Amit Lahiri, Dnyaneshwar U. Bawankule, Srikanta Kumar Rath, Dinesh Kumar and Madhav Nilakanth Mugale.

Metabolism: Clinical and Experimental, 2024, 152.

Sharmeen Ishteyaque

Dr. Madhav Mugale

Hepatocellular carcinoma (HCC) continues to pose a significant health challenge and is often diagnosed at advanced stages. Metabolic reprogramming is a hallmark of many cancer types, including HCC and it involves alterations in various metabolic or nutrient-sensing pathways within liver cells to facilitate the rapid growth and progression of tumours. However, the role of STAT3-NFκB in metabolic reprogramming is still not clear. In a study conducted at CSIR-CDRI, the Diethylnitrosamine (DEN) administered animals showed decreased body weight and elevated level of serum enzymes. The enzyme-linked immunosorbent assay (ELISA) concentration of IL-6 was found to be elevated in time dependent manner both in blood serum and liver tissue. Moreover, immunoblot analysis showed increased level of p-STAT3, p-NF$\kappa\beta$ and IL-6 stimulated the upregulation of mitophagy proteins such as Drp-1, Phosphatase and tensin homolog (PTEN)-induced putative kinase 1 (PINK-1). Meanwhile, downregulation of Poly [ADP-ribose] polymerase 1 (PARP-1) and cleaved caspase 3 suppresses apoptosis and enhanced expression of AFP supports tumorigenesis. The mRNA level of STAT3 and Drp-1 was also found to be significantly increased. Furthermore, we performed high-field 800 MHz Nuclear Magnetic Resonance (NMR) based tissue and serum metabolomics analysis to identify metabolic signatures associated with the progression of liver cancer. The metabolomics findings revealed aberrant metabolic alterations in liver tissue and serum of 75th and 105th days of intervention groups in comparison to control, 15th and 45th days of intervention groups. Tissue metabolomics analysis revealed the accumulation of succinate in the liver tissue samples, whereas, serum metabolomics analysis revealed significantly decreased circulatory levels of ketone bodies (such as 3-hydroxybutyrate, acetate, acetone, etc.) and membrane metabolites suggesting activated ketolysis in advanced stages of liver cancer. The results suggest that the STAT3-NF$\kappa\beta$ signaling axis has a significant role in mitochondrial dysfunction and metabolic alterations in the development of HCC



Research Highlights

Alendronate-Functionalized Porous Nano-Crystalsomes Mitigate Osteolysis and Consequent Inhibition of Tumor Growth in a Tibia-Induced Metastasis Model

Ravi Prakash Shukla, Pratiksha Tiwari, Anirban Sardar, Sandeep Urandur, Shalini Gautam, Disha Marwaha, Ashish Kumar Tripathi, Nikhil Rai, Ritu Trivedi and Prabhat Ranjan Mishra.

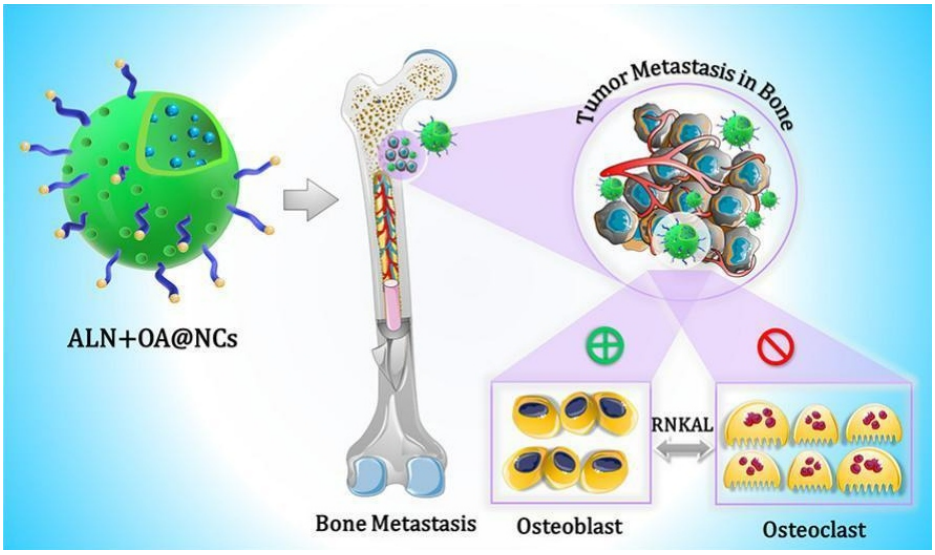
Journal of Controlled Release, 2024, 372, 331-346.

Bone is one of the most prevalent sites of metastases in various epithelial malignancies, including breast cancer and this metastasis to bone often leads to severe skeletal complications in women due to its osteolytic nature. To address this, we devised a novel drug delivery approach using an Alendronate (ALN) functionalized self-assembled porous crystalsomes for concurrent targeting of Oleanolic acid (OA) and ALN (ALN + OA@NCs) to bone metastasis. Initially, the conjugation of both PEG-OA and OA-PEG-ALN with ALN and OA was achieved, and this conjugation was then self-assembled into porous crystalsomes (ALN + OA@NCs) by nanoemulsion crystallization. The reconstruction of a 3D single particle using transmission electron microscopy ensured the crystalline porous structure of ALN + OA@NCs, was well aligned with characteristic nanoparticle attributes including size distribution, polydispersity, and zeta potential. Further, ALN + OA@NCs showed enhanced efficacy in comparison to OA@NCs suggesting the cytotoxic roles of ALN towards cancer cells, followed by augmentation ROS generation (40.81%), mitochondrial membrane depolarization (57.20%), and induction of apoptosis (40.43%). We found that ALN + OA@NCs facilitated inhibiting osteoclastogenesis and bone resorption followed by inhibited osteolysis. *In vivo* activity of ALN + OA@NCs in the 4 T1 cell-induced tibia model rendered a reduced bone loss in the treated mice followed by restoring bone morphometric markers which were further corroborated bone-targeting effects of ALN + OA@NCs to reduce RANKL-stimulated osteoclastogenesis. Further, In vivo intravenous pharmacokinetics showed the improved therapeutic profile of the ALN + OA@NCs in comparison to the free drug, prolonging the levels of the drug in the systemic compartment by reducing the clearance culminating the higher accumulation at the tumor site. Our finding proposed that ALN + OA@NCs can effectively target and treat breast cancer metastasis to bone and its associated complications.

Ravi Prakash Shukla

Dr. Ritu Trivedi

Dr. Prabhat R Mishra



Research Highlights

Dacarbazine-Primed Carbon Quantum Dots Coated with Breast Cancer Cell-Derived Exosomes for Improved Breast Cancer Therapy

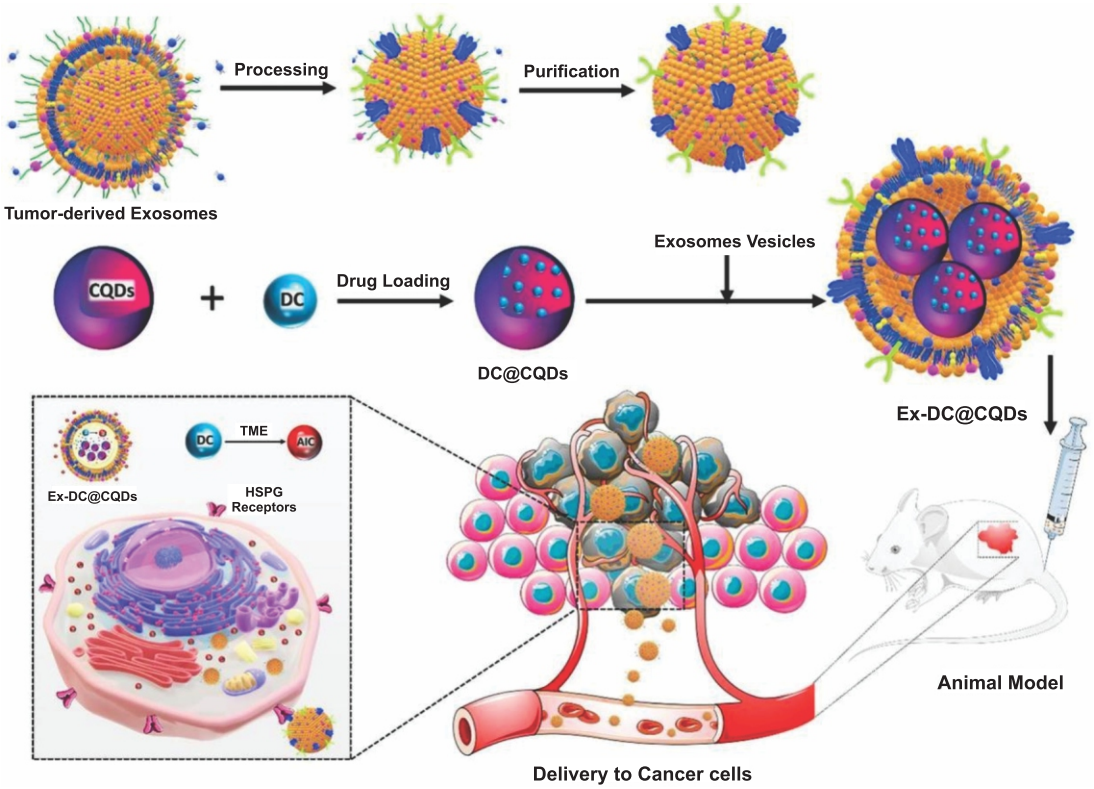
Pratiksha Tiwari, Ravi Prakash Shukla, Krishna Yadav, Neha Singh, Disha Marwaha, Shalini Gautam, Avijit Kumar Bakshi, Nikhil Rai, Ankit Kumar, Deepak Sharma and Prabhat Ranjan Mishra.

Journal of Controlled Release, 2024, 365, 43-59.

Pratiksha Tiwari

Dr. Prabhat R. Mishra

Imprecise targeting of chemotherapeutic drugs often leads to severe toxicity during breast cancer therapy. To address this issue, we have devised a strategy to load dacarbazine (DC) into fucose-based carbon quantum dots (CQDs), which are subsequently coated with exosomes (Ex-DC@CQDs) derived from breast cancer cells. Nanoparticle tracking analysis and western blotting revealed that Ex-DC@CQDs retained the structural and functional characteristics of exosomes. We found that exosomes facilitated the transport of DC@CQDs to cancer cells via heparan sulfate proteoglycan (HSPG) receptors, followed by an augmented depolarization of the mitochondrial membrane potential, ROS generation, and induction of apoptosis leading to cell death. *In vivo* imaging and pharmacokinetic studies demonstrated enhanced antitumor targeting and efficacy compared to free DC which we attribute to an improved pharmacokinetic profile, a greater tumor accumulation via exosome-mediated- HSPG receptor-driven cell uptake, and sustained release of the Ex-DC@CQDs. Our findings may pave the way for the further development of biologically sourced nanocarriers for breast cancer targeting.



Research Highlights

Regeneration Capability of Neonatal Lung-Derived Decellularized Extracellular Matrix in an Emphysema Model

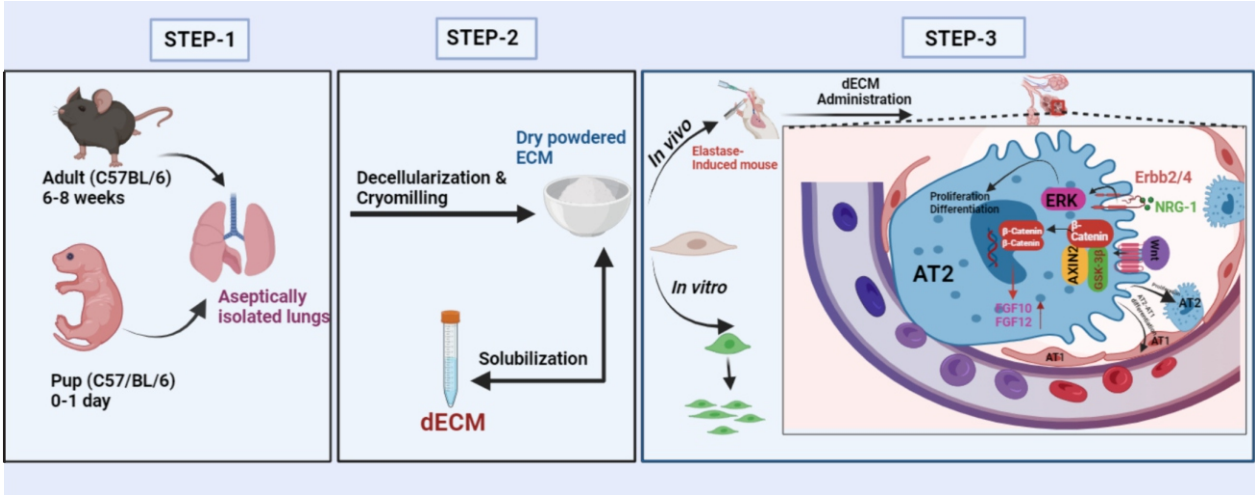
Kusum Devi, Manendra Singh Tomar, Mohit Barsain, Ashutosh Shrivastava and Baisakhi Moharana.

Journal of Controlled Release, 2024, 372, 234-250.

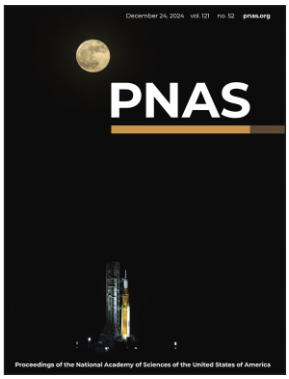
Kusum Devi

Dr. Baisakhi Moharana

Impaired and limited alveolar regeneration upon injury advances pulmonary disorders and irreversibly affects millions of people worldwide. Adult mammals do not have a strong potential to regenerate functional lung tissues, while neonatal lungs robustly proliferate and regenerate the functional tissue within a week of birth upon injury. The differential composition of the extracellular matrix (ECM) of neonatal tissues favors cellular proliferation and migration, fostering lung regeneration. Regardless, conventional ECM therapies employ adult-derived tissues. Therefore, the potential differences in regenerative properties of adult and neonatal lung ECM were investigated using *in vitro* and *in vivo* lung emphysema model. Decellularization of the neonatal and adult lungs was performed using freeze-thaw cycle method. Decellularization process was structurally characterized using SEM and immunostaining. *In vitro* treatment of neonatal lung-derived ECM (NECM) significantly enhanced the cellular migration and proliferation compared to adult-lung derived ECM (AECM) treated cigarette smoke-extract (CSE)-stimulated A549 cells. Following the administration of AECM and NECM, we observed a significant decline in emphysematous features and an improvement in lung functions in NECM group. NECM treatment increased the ratio of $HOPX^{+}/SpC^{+}$ cells with an active proliferation in SpC^{+} cells shown by colocalization of $SpC^{+}/Ki67^{+}$ and $SpC^{+}/Brdu^{+}$ cells. Moreover, NECM treatment activated the Neureguline-1/Erbb2 signaling and fostered a regenerative environment by upregulating the expression of regenerative genes including FGF, WNTs and AXIN-2 as compared to AECM treatment. Our findings suggested the potential utilization of NECM as novel therapeutics in regenerative medicine, deviating from the conventional application of adult-derived ECM treatments in pre-clinical and clinical research.



Research Highlights



ACSL4-Mediated H3K9 and H3K27 Hyperacetylation Upregulates SNAIL to Drive TNBC Metastasis

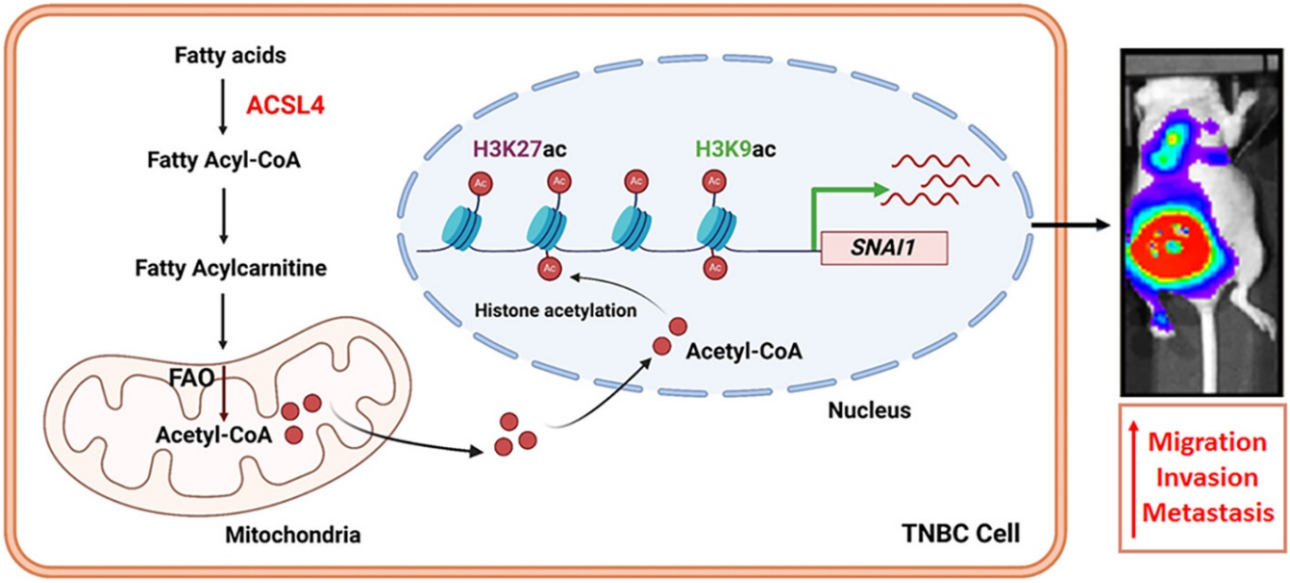
Abhipsa Sinha, Krishan Kumar Saini, Aakash Chandramouli, Kiran Tripathi, Muqtada Ali Khan, Saumya Ranjan Satrusal, Ayushi Verma, Biswajit Mandal, Priyanka Rai, Sanjeev Meena, Mushtaq Ahmad Nengroo, Manish Pratap Singh, Namratha Shashi Bhushan, Madavan Vasudevan, Atin Singhai, Kulranjan Singh, Anand Kumar Mishra, Siddhesh S. Kamat and Dipak Datta.

Proceedings of the National Academy of Sciences of the United States of America, 2024, 121 (52).

Abhipsa Sinha

Dr. Dipak Datta

Triple-negative breast cancer (TNBC) has profound unmet medical need globally for its devastating clinical outcome associated with rapid metastasis and lack of targeted therapies. Recently, lipid metabolic reprogramming especially fatty acid oxidation (FAO) has emerged as a major driver of breast cancer metastasis. Analyzing the expression of major FAO regulatory genes in breast cancer, we found selective overexpression of acyl-CoA synthetase 4 (ACSL4) in TNBC, which is primarily attributed to the absence of progesterone receptor. Loss of ACSL4 function, by genetic ablation or pharmacological inhibition significantly reduces metastatic potential of TNBC. Global transcriptome analysis reveals that ACSL4 activity positively influences the gene expression related to TNBC migration and invasion. Mechanistically, ACSL4 modulates FAO and intracellular acetyl-CoA levels, leading to hyperacetylation of particularly H3K9ac and H3K27ac marks resulting in overexpression of SNAIL during the course of TNBC metastatic spread to lymph node and lung. Further, human TNBC metastasis exhibits positive correlation among ACSL4, H3K9ac, H3K27ac, and SNAIL expression. Altogether, our findings provide molecular insights regarding the intricate interplay between metabolic alterations and epigenetic modifications, intertwined to orchestrate TNBC metastasis, and posit a rational understanding for the development of ACSL4 inhibitors as a targeted therapy against TNBC.



ACSL4-driven histone H3K9 and H3K27 hyperacetylation and SNAIL upregulation promote TNBC metastasis Illustration depicting heightened ACSL4 activity plays a pivotal role in fostering elevated FAO and cellular Acetyl-CoA levels. This, in turn, leads to enhanced enrichment of histone H3K9ac and H3K27ac on the SNAI1 promoter, resulting in SNAIL upregulation. Consequently, this molecular cascade drives increased migration, invasion, and metastasis in TNBC.

Research Highlights

Corannulene Amino Acid-Derived Water-Soluble Amphiphilic Buckybowls as Broad-Spectrum Membrane Targeting Antibacterial Agents

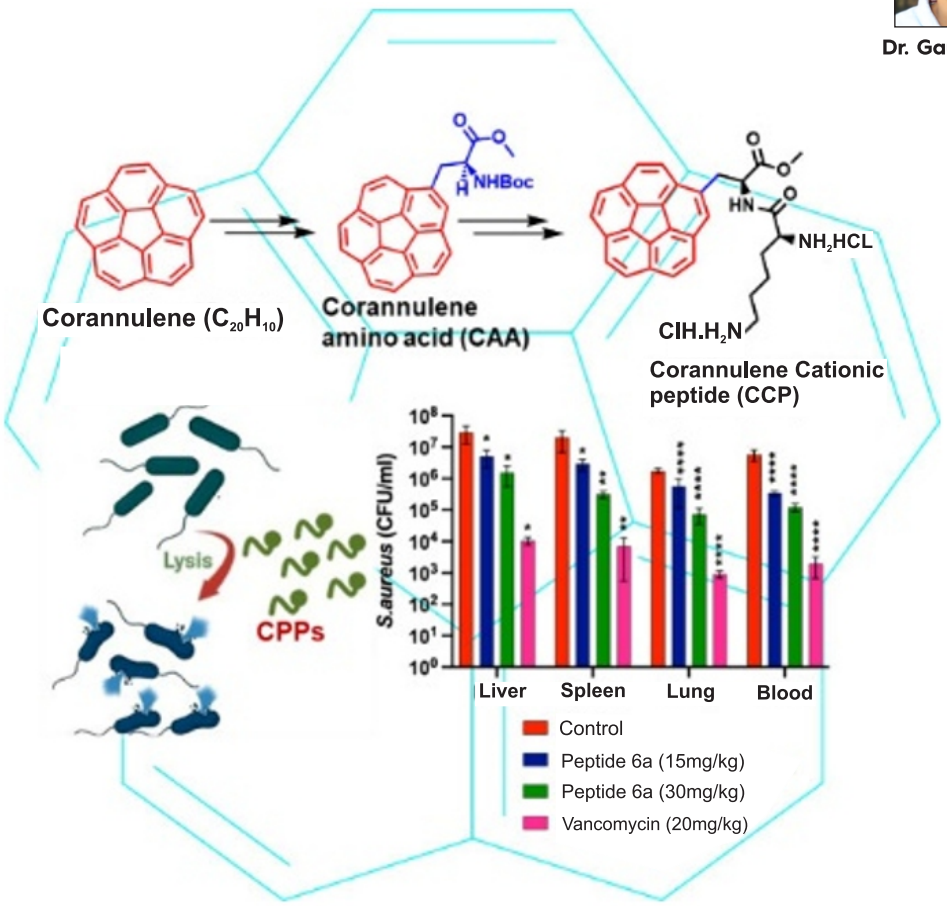
Saroj Maji, Sariyah Akhtar, Sabyasachi Halder, Indranil Chatterjee, Devesh Pratap Verma, Neeraj Kumar Verma, Jyotshana Saroj, Deepanshi Saxena, Rahul Maitra, Juhi Sharma, Bhawana Sharma, Hidehiro Sakurai, Kalyan Mitra, Sidharth Chopra, Jimut Kanti Ghosh and Gautam Panda.

Journal of Medicinal Chemistry 2024, 67(17), 15041-15060.

Saroj Maji

Dr. Gautam Panda

To date, the use of corannulene has been restricted in the area of material science, but its application in biomedical research has yet to be established due to its nonsolubility in an aqueous environment and synthetic infeasibility. Herein, we detail the development of a new family of highly curved π-conjugated corannulene-containing unnatural α-amino acid (CAA) derivatives to overcome this challenge. These CAAs have been extended as novel constituents for the synthesis of corannulene-containing water-soluble cationic peptides (CCPs), which display inhibitory activity against broad-spectrum pathogenic bacteria along with drug-resistant bacteria via a membrane-damaging mechanism. Importantly, several of the synthesized peptides were found to be appreciably nonhemolytic against hRBCs and noncytotoxic against mammalian 3T3 cells. *In vivo* efficacy studies of the potent and least cytotoxic peptide 6a demonstrated clearance of bacteria from the spleen, liver, lung, and blood of mice infected with *S. aureus* ATCC 25923.



Research Highlights

Design, Synthesis, and Biological Evaluation of 1,4-Dihydropyridine-Indole as a Potential Antidiabetic Agent via GLUT4 Translocation Stimulation

Sarita Katiyar, Shadab Ahmad, Abhishek Kumar, Alisha Ansari, Amol Chhatrapati Bisen, Ishbal Ahmad, Farah Gulzar, Rabi Sankar Bhatta, Akhilesh K. Tamrakar and Koneni V. Sashidhara.

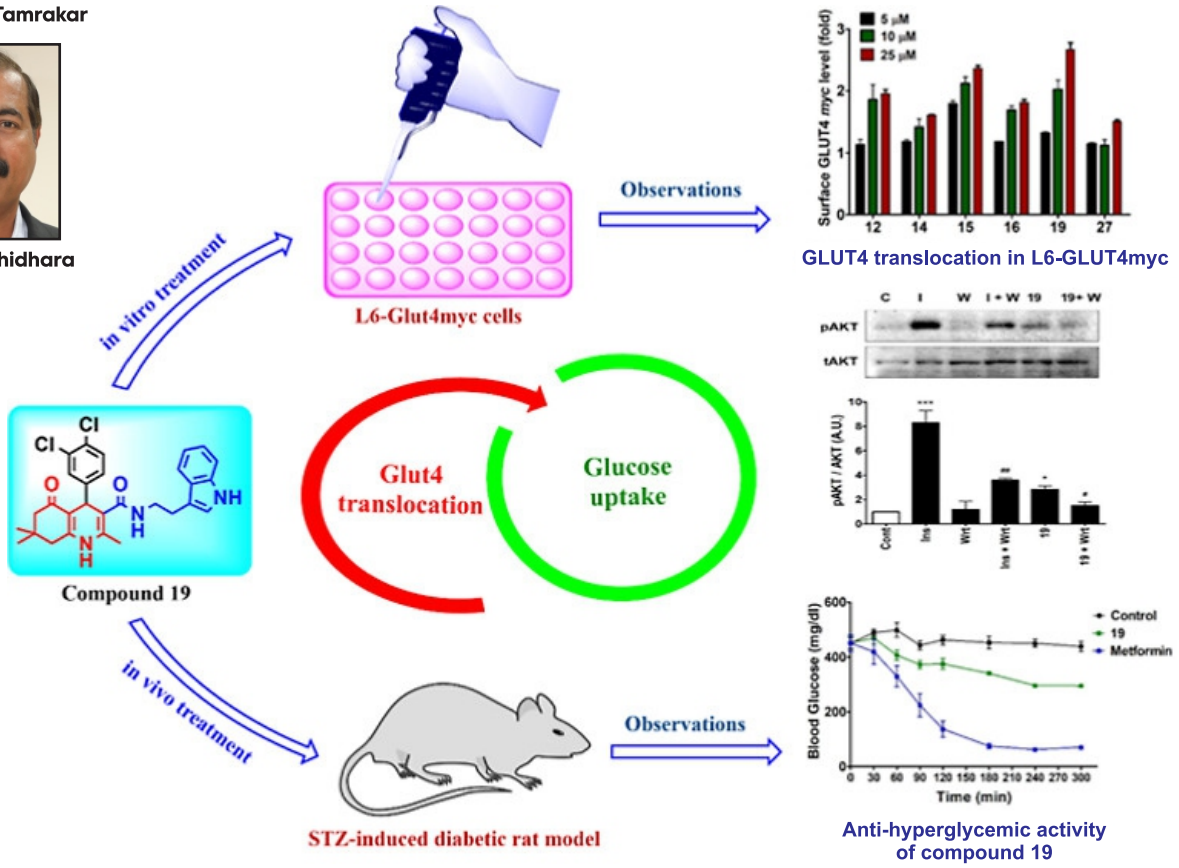
Journal of Medicinal Chemistry 2024, 67(14), 11957-11974.

Sarita Katiyar

Dr. Akhilesh Tamrakar

Dr. K V Sashidhara

In the quest for the discovery of antidiabetic compounds, a series of 27 1,4-dihydropyridine–indole derivatives were synthesized using a diversity approach. These compounds were systematically evaluated for their antidiabetic activity, starting with an *in vitro* assessment for GLUT4 translocation stimulation in L6-GLUT4*myc* myotubes, followed by *in vivo* antihyperglycemic activity evaluation in a streptozotocin (STZ)-induced diabetic rat model. Among the synthesized compounds, **12, 14, 15, 16, 19, 27**, and **35** demonstrated significant potential to stimulate GLUT4 translocation in skeletal muscle cells. Compound **19** exhibited the highest potency and was selected for *in vivo* evaluation. A notable reduction of 21.6% ($p < 0.01$) in blood glucose levels was observed after 5 h of treatment with compound **19** in STZ-induced diabetic rats. Furthermore, pharmacokinetic studies affirmed that compound **19** was favorable to oral exposure with suitable pharmacological parameters. Overall, compound **19** emerged as a promising lead compound for further structural modification and optimization.



Research Highlights

Generating a Peptide Library Using the Repeats of Amino Acid Scaffolds Created by Sliding the Framework of a 7-mer Human Chemerin Segment and Discovery of Potent Antibacterial and Antimycobacterial Peptides

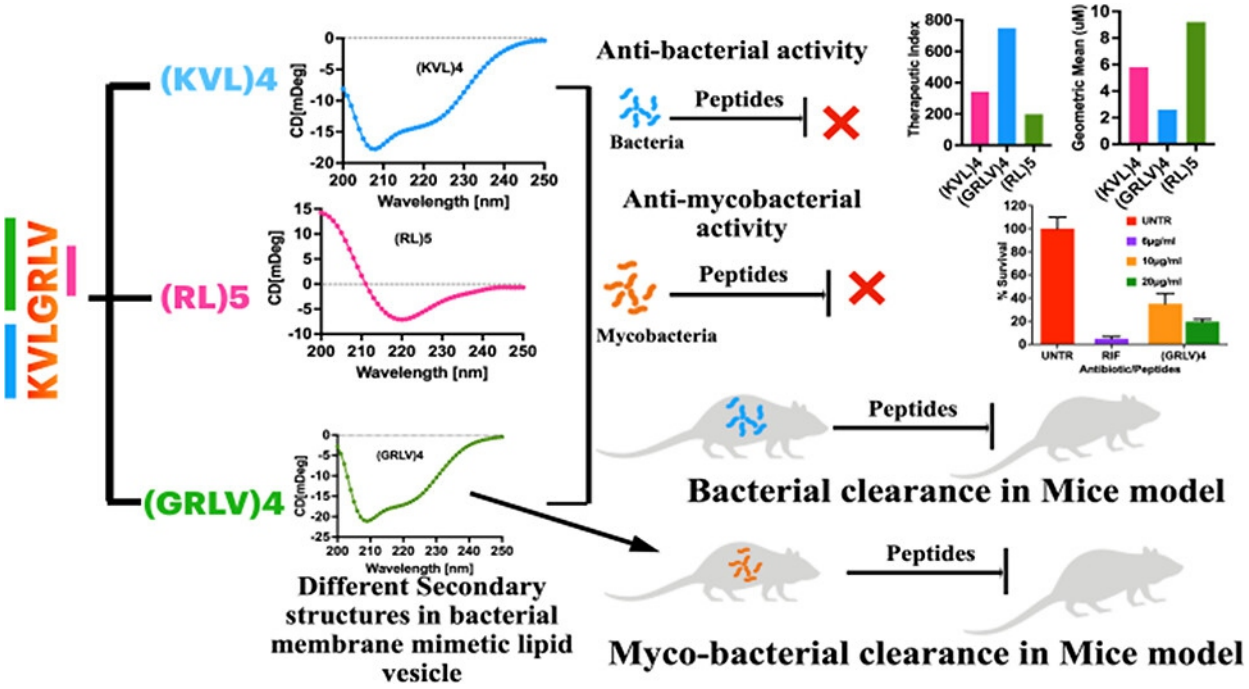
Sariyah Akhtar, Mohd Mustkim Ansari, Rahul Dev Verma, Juhi Sharma, Arvind Gupta, Rajendra Kumar Dhuriya, Devesh Pratap Verma, Jyotshana Saroj, Mehmood Ali, Neeraj Kumar Verma, Kalyan Mitra, Bhupendra Narain Singh and Jimut Kanti Ghosh.

Journal of Medicinal Chemistry 2024, 68(1), 566-589.

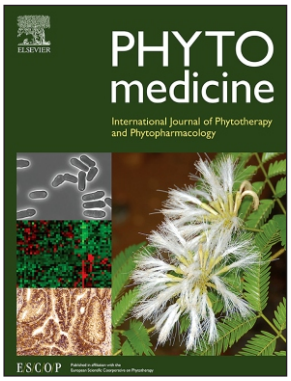
Sariyah Akhtar

Dr. Jimut Kanti Ghosh

The quest for new approaches for generating novel bioactive designer proteins/peptides has continued with their success in various biomedical applications. Previously, we designed a 14-mer α-helical peptide with antimicrobial and antimycobacterial activities by employing a tandem repeat of the 7-mer, "KVLGRLV" human chemerin segment. Herein, we devised a new method of "sliding framework" with this segment to create amino acid scaffolds of varying sizes and sequences and explored the design of a peptide library with antibacterial and antimycobacterial activities. By utilizing 2 to 7 repeats of these 2 to 6-residue scaffolds, we designed and synthesized 30 peptides of 10–16 residue lengths. Thus, we identified novel AMPs with α-helical, β-sheet, and random coil structures, membrane-destabilizing, and intracellular modes of action, and 9 of them showed therapeutic indices between 100 and 750. Three and two of these nine peptides showed *in vivo* antibacterial and antitubercular efficacies against *Escherichia coli* ATCC 25922 and *Mycobacterium bovis* BCG infections, respectively, in a mouse model.



Research Highlights



Androsin Alleviates Non-Alcoholic Fatty Liver Disease by Activating Autophagy and Attenuating *de novo* Lipogenesis

Abhinav Singh, Alisha Ansari, Jay Gupta, Himalaya Singh, Kumaravelu Jagavelu and Koneni V. Sashidhara.

Phytomedicine, 2024, 129, 155702.

Abhinav Singh

Alisha Ansari

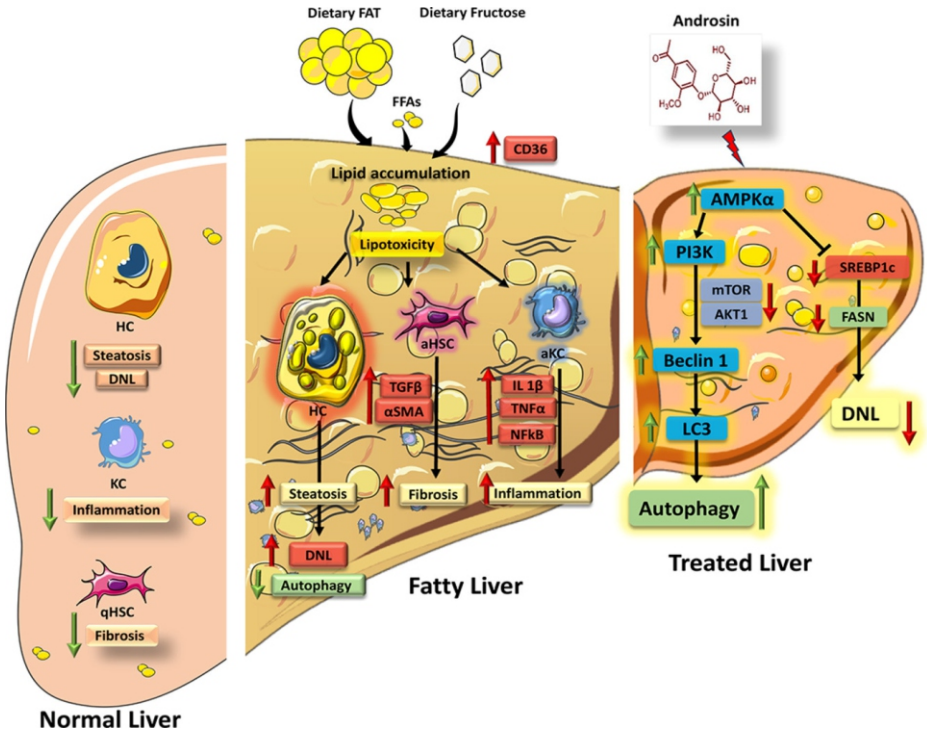
Dr. Kumaravelu Jagavelu

Dr. K. V. Sashidhara

Non-Alcoholic Fatty Liver Disease (NAFLD) is a chronic liver disease with therapeutic options on the horizon. *Picrorhiza kurroa*, enriched with iridoid glycosides like picroside I and picroside II is known for its hepatoprotective activity and anti-inflammatory properties. This study aimed to identify the potent hepatoprotective agent from *P. kurroa* that can attenuate NAFLD in HFrD-fed ApoE$^{-/-}$ mice, and elucidate the underlying mechanisms governing its effects. Classical purification methods were used to isolate seven compounds, including picroside I, picroside II and androsin from the roots of *P. kurroa*. NAFLD-induced ApoE$^{-/-}$ mice were administered orally with either picroside I, picroside II, or androsin for 7 weeks.

In vitro and *in vivo* studies revealed that among the seven evaluated compounds, androsin shows the most potent *in vitro* activity. Oral dosing of androsin (10 mg/kg) protected the liver against HFrD-induced NAFLD in ApoE$^{-/-}$ mice model. Biochemical analysis revealed a reduction in ALT and AST enzymes and a significant reduction in cholesterol levels. Hepatocyte ballooning, hepatic lipid deposition, inflammation, and fibrosis were reduced. Androsin treatment significantly reduced fibrosis (α-SMA, collagens, TGF-β) and inflammation (ILs, TNF-α, NFκB) in ApoE$^{-/-}$ mice. Mechanistically, androsin activated AMPKα and down-regulated the expression of SREBP-1c, resulting in ameliorating hepatic lipogenesis.

Our results support autophagy as one of the therapeutic strategies to reduce steatosis and hepatic damage. We found that androsin treatment significantly ameliorated hepatic steatosis, serum lipid levels, and hepatic injury in ApoE$^{-/-}$ induced by HFrD. Androsin administration mitigated lipogenesis by inhibiting SREBP1c/FASN pathway and activating autophagy through AMPKα/PI3K/Beclin1/LC3 pathway.



Institutional Awards & Recognitions

Excellence for Women in STEM 2024: CII Award

(L to R): Dr Ashish Mohan, Executive Director, CII, Dr. Naseem Ahmed Siddiqui, Head, Business Development, CSIR-CDRI, Dr. Akhilesh Gupta, Adviser & Distinguished Visiting Professor, IIT Roorkee & Former Secretary, SERB, Dr. VK Saraswat, Member, NITI Aayog, Dr. Ritu Trivedi, Senior Principal Scientist, CSIR-CDRI, Dr. Shubha Shukla, Principal Scientist, CSIR-CDRI, Ms. Vaishali Nigam Sinha, Chairperson, CII Awards on Excellence for Women in STEM ,Dr. Brajesh Pandey, Executive Director, Indian National Science Academy

Institutional Awards & Recognitions

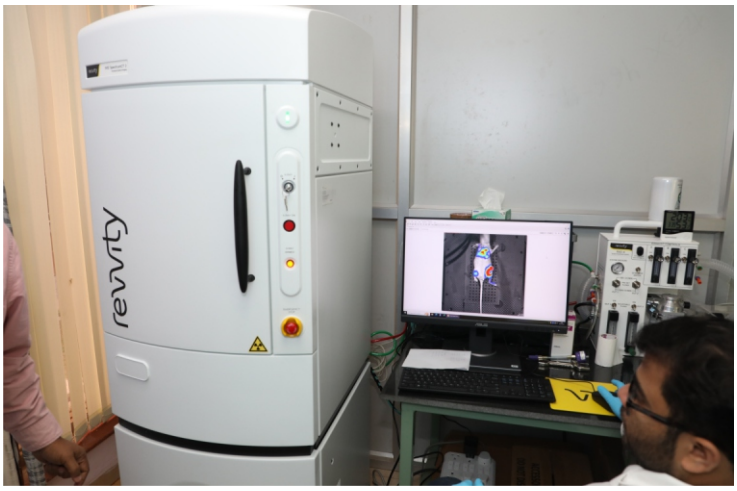
Recognition of Excellence Award for Best Extramural Institute (Government S&T Institute) by DHR-ICMR

(L to R): Ms. Anu Nagar, JS, DHR, Dr Rajiv Bahl, Secretary, DHR, Smt. Anupriya Patel, Hon'ble Minister., Dr. Sanjay Batra, Chief Scientist, CSIR-CDRI, Dr. VK Paul, Niti Ayog, and Ms. Manisha Saxena

New Facility Creation

High Through-Put Next Generation *in vivo* Small Animal Imaging System with X-Ray

The IVIS SpectrumCT 2 *in vivo* imaging system combines advanced optical imaging features, including spectral unmixing and 2D and 3D quantitative bioluminescence and fluorescence imaging, with fast, low-dose microCT imaging. It is equipped with a CCD camera featuring eXcelon® coating, which improves signal detection efficiency across a wide range of wavelengths. The system is operated through the user-friendly Living Image® software, which provides advanced visualization and analysis tools. The IVIS SpectrumCT 2 supports longitudinal studies, allowing researchers to monitor disease progression and therapeutic responses over time with both optical and CT imaging. Its fast imaging speed and ability to scan multiple animals simultaneously make it ideal for large cohort studies, helping researchers quickly gather reliable experimental data.



Nuclear Magnetic Resonance (NMR) 500 MHz with HRMAS Facility

The system is equipped with a SmartProbe™ (iProbe), a 5 mm Broadband Inverse Probe featuring a Z-axis gradient (Z-Grd) and a Variable Temperature (VT) unit. This probe delivers exceptional sensitivity for ^{1}H detection and supports a wide range of X-nuclei (including ^{13}C, ^{15}N, ^{31}P, ^{19}F), with fully automated tuning and matching, enhancing ease of use and efficiency in multinuclear experiments. Additionally, the spectrometer includes a 5 mm HR-MAS dual $^{13}C/^{1}H$ probe (Z-Grd), specifically designed for high-resolution magic angle spinning (HRMAS), enabling the study of semi-solid, gel-like, or heterogeneous samples with excellent spectral quality.

New Facility Creation

High End, High Sensitivity Triple Quadrupole Mass Spectrometer with Shimadzu Nexera Series Model X3 Ultra High Performance Liquid Chromatography System

Shimadzu high sensitive latest version (LCMS-8060NX) Triple Quadrupole UHPLC-MS/MS equipped with DUIS enable simultaneous ESI and APCI mode. This technology provides high-speed analysis of analytical and bioanalytical samples of *in vitro, in vivo,* preclinical and clinical studies. The latest version of LabSolutions and Insight software provides fastest data processing for complicated analysis

Xevo G3 QTof (LC-HRMS/MS) System Equipped with ACQUITY H-Class UPLC System

It is the latest generation of the Waters product that extends the simplicity and range of characterization, from challenging small molecules to complex samples. Its design provides consistent robustness and performance, incorporating core technology for comprehensive qualitative and quantitative capabilities. Waters Quadrupole Time-of-Flight MS systems, which include QuanTof, Fast DDA, and MSE technologies, deliver top performance for UPLC-MS/MS to handle difficult qualitative and quantitative tasks.

Scientific Social Responsibility (SSR) Activities

The CSIR-CDRI is committed for promoting scientific temper, enhancing health literacy, and supporting inclusive and equitable access to science education throughout the country.

During the reporting period, a total of 106 Science Outreach programs were organized, which, included the flagship Students-Scientist Connect Program under the Jigyasa, aimed at fostering scientific awareness and public engagement across diverse communities.

These initiatives positively impacted students and faculty from over 100 schools and colleges. Through these programs, the Institute successfully connected with more than 10,000 students, 2,500 faculty members, and over 18,000 beneficiaries including general public, strengthening the bridge between science and society.

The outreach efforts spanned over 40 districts across Uttar Pradesh, covering major locations such as Lucknow, Barabanki, Sitapur, Kanpur, Prayagraj, Deoria, Ayodhya, Gorakhpur, and Bijnor. Further extending its geographical reach, CSIR-CDRI conducted programs in other Indian states including Madhya Pradesh, Maharashtra, and Uttarakhand thus expanding its impact at the national level.

As part of its extensive outreach, CSIR-CDRI also celebrated and organized a series of thematic and awareness-based programs, such as:

- Vigyan Jyoti (Promoting girls in STEM)
- CSIR One Week One Theme Program
- World Antimicrobial Resistance (AMR) Week
- National Science Day 2025
- Open Day Celebrations
- Science Outreach – Scientist as a Teacher
- Science Outreach – Health Awareness for School Kids
- Science Outreach – Swasthya Chaupal & Health Check-up Camps
- Science Video Production Workshop
- Mental Health Awareness Program

Industry-Academia Collaborations

CSIR-CDRI signed MoU with NIPER, Ahmedabad on 21-03-2025 to promote institutional linkage between CSIR-CDRI and NIPER-A and to explore avenues for possible collaboration.

CSIR-CDRI signed MoU with HealthCare Global Enterprises Limited, Bengaluru on 03-05-2024 to develop synergetic collaborations in various areas of cancer biology.

CSIR-CDRI signed MoU with IN Covid Support FZE LLC, United Arab Emirates on 20-09-2024 for funding of research projects of global importance

CSIR-CDRI signed Collaborative Research Agreement with Zydus Lifesciences Limited, Ahmedabad on 13-09-2024 for Discovery and development of sclerostin-targeting molecules for disease-modifying osteoporosis therapy

CSIR-CDRI signed Collaborative Research Agreement with KGMU, Lucknow on 13-11-2024 for Development of in-house TaqMan-like probe based RT-PCR detection kit for arboviral infections (DEN, CHIK, ZIKA)

CSIR-CDRI signed Institutional MoU with Centre for High Impact Neuroscience and Translational Applications (CHINTA), TCG CREST, Kolkata on 17-02-2025 To promote institutional linkage

Research Council
(01-09-2023 - 31-08-2026)

Dr. T. S. Balganesh,
President,
GangaGen Biotechnologies Pvt.Ltd.
Bengaluru

Chairperson

Members

Dr. C. S. Pramesh
Director,
Tata Memorial Hospital,
Mumbai

Dr. Priya Abraham
Professor,
Department of Clinical Virology
Christian Medical College, Vellore

Dr. Vikram Ramanathan
Senior Vice President, Translational Development,
Sun Pharma Advanced Research Company Ltd, Vadodara

Dr. Ullas Kolthur Seetharam
Director,
Centre for DNA Fingerprinting and Diagnostics,
Hyderabad

Dr. Rajeev Singh Raghuvanshi
Drugs Controller General (India),
Central Drugs Standard Control Organization (HQ), New Delhi

Dr. D. Srinivasa Reddy
Director,
CSIR- Indian Institute of Chemical Technology, Hyderabad

Dr. Radha Rangarajan
Director,
CSIR-Central Drug Research Institute
Lucknow

Dr. Viswajanani J Sattigeri
Head,
Traditional Knowledge Digital Library (TKDL), New Delhi

Secretary
Dr. Prem Prakash Yadav
Sr. Principal Scientist,
CSIR-Central Drug Research Institute
Lucknow

Management Council
(01-01-2024 - 31-12-2025)

Dr. Radha Rangarajan
Director
CSIR-CDRI, Lucknow

Chairperson

Members

Dr. Bhaskar Narayan
Director
CSIR-IITR, Lucknow

Dr. T Narender
Chief Scientist
Medicinal and Process Chemistry
CSIR-CDRI, Lucknow

Dr. KV Sashidhara
Chief Scientist
Medicinal and Process Chemistry
CSIR-CDRI, Lucknow

Dr. Chetan Meshram
Senior Scientist
Virus Research and Therapeutics
CSIR-CDRI, Lucknow

Dr. Shashi Kumar Gupta
Senior Scientist
Pharmacology
CSIR-CDRI, Lucknow

Dr. Anand P Kulkarni
Senior Principal Scientist &
Head PME
CSIR-CDRI, Lucknow

Ms. Sarita Tripathi
Senior Technical Officer (I)
Biochemistry & Structural Biology
CSIR-CDRI, Lucknow

Mr. Sanjeev Shekhar
Controller of Finance & Accounts
CSIR-CDRI, Lucknow

Member Secretary
Mr. Bhaskar Jyoti Deuri
Senior Controller of Administration
CSIR-CDRI, Lucknow

Budget

Rs. in lakh

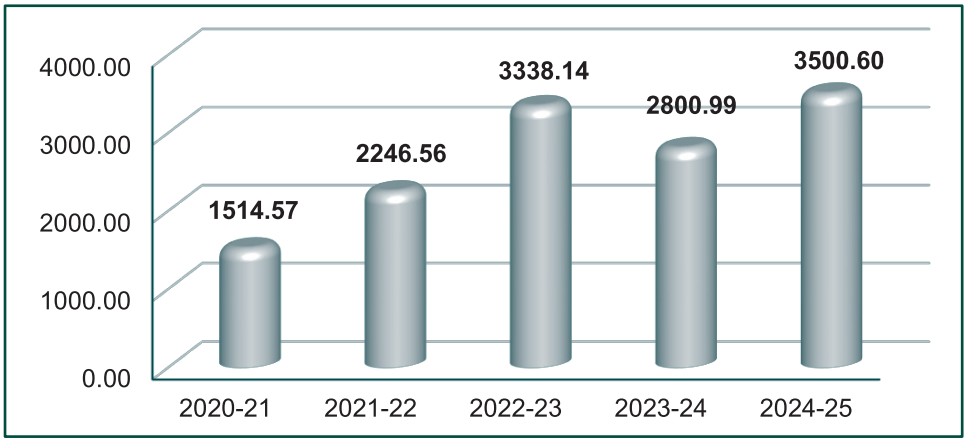
	Budget Heads	2020-21	2021-22	2022-23	2023-24	2024-25
(A)	**Recurring**					
1	Pay and Allowances	5637.060	5676.520	6109.337	6725.660	7052.123
2	Contingencies	1175.000	1214.832	1728.599	1397.561	1232.000
3	Maintenance (Lab and Staff Quarters)	833.300	1125.607	1210.275	1295.176	1196.000
4	Chemical and Consumables	546.140	1109.000	1794.994	1398.665	1420.800
	Sub-Total	**8191.500**	**9125.959**	**10843.205**	**10817.062**	**10900.923**
(B)	**Capital**					
1	Works and Services / Electrical Installation	53.982	70.617	166.300	150.00	101.530
2	Apparatus and Equipment/ Computer Equipment	568.290	559.436	739.000	853.271	1450.000
3	Furniture and Fittings	-	2.250	20.000	29.880	30.000
4	Library Books and Journals	166.422	451.127	178.000	0.00	0.098
5	Vehicle					17.58
	Sub-Total	**788.694**	**1083.430**	**1103.300**	**1033.151**	**1599.208**
	Total (A+B)	**8980.194**	**10209.389**	**11946.505**	**11850.213**	**12500.131**
(C)	**Special Projects HCP/ NCP / FTT / FBR / CSIR First / NMITLI**	**379.020**	**1259.054**	**2290.671**	**1447.410**	**1815.360**
(D)	**Pension and other Retirement Benefits**	**6529.000**	**6148.094**	**6478.878**	**7057.158**	**7958.000**
	Grand Total (A+B+C+D)	**15888.214**	**17616.537**	**20716.054**	**20354.781**	**22273.491**

***Data as on 01-04-2025**

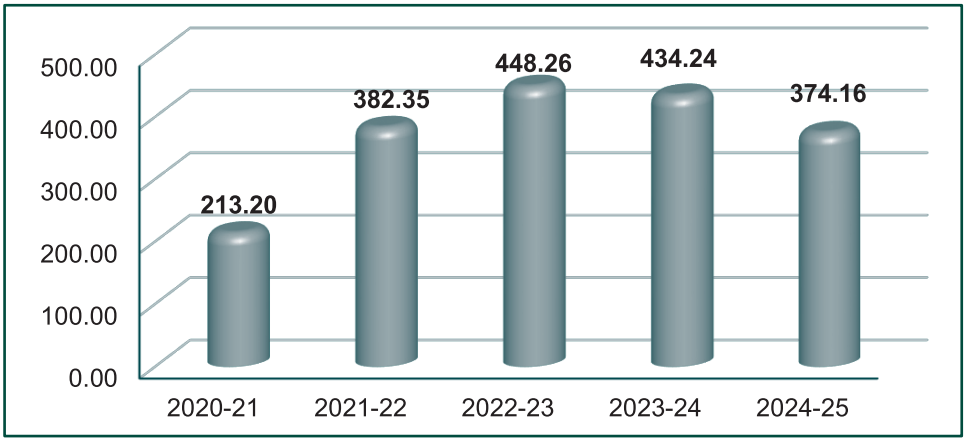
External Budgetary Resources

Rs. in lakh

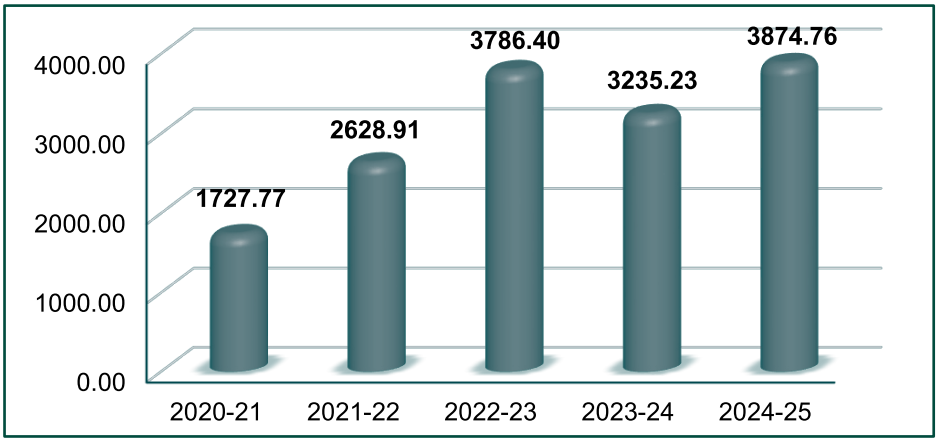
External Cash Flow from Government Agencies & Industries



Lab Reserve Fund Generated



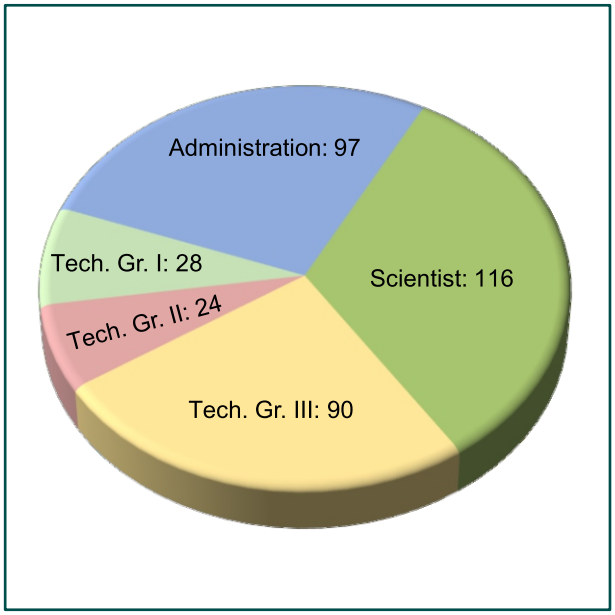
Total External Budgetary Resources (ECF + LRF)



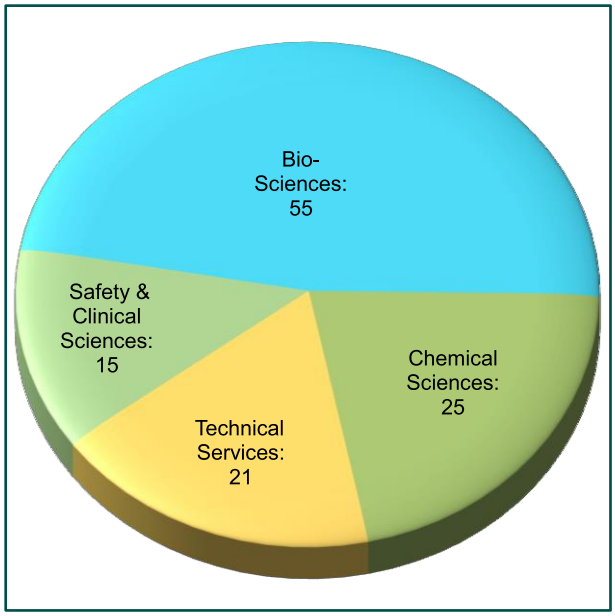
***Data as on 01-04-2025**

Human Resource

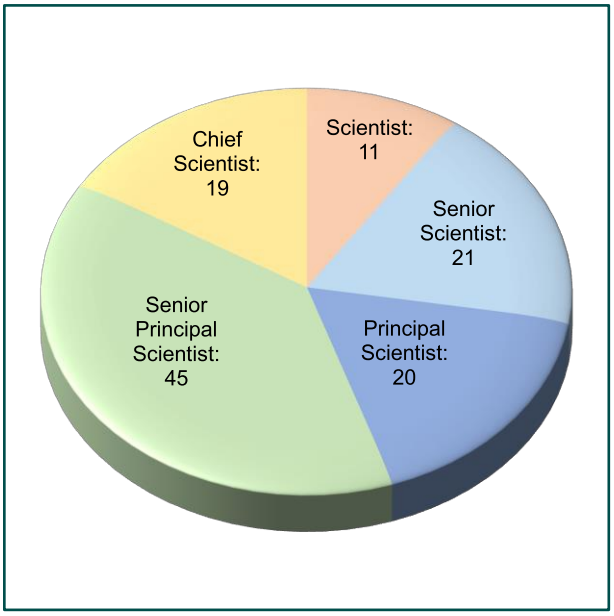
Total Staff (355)



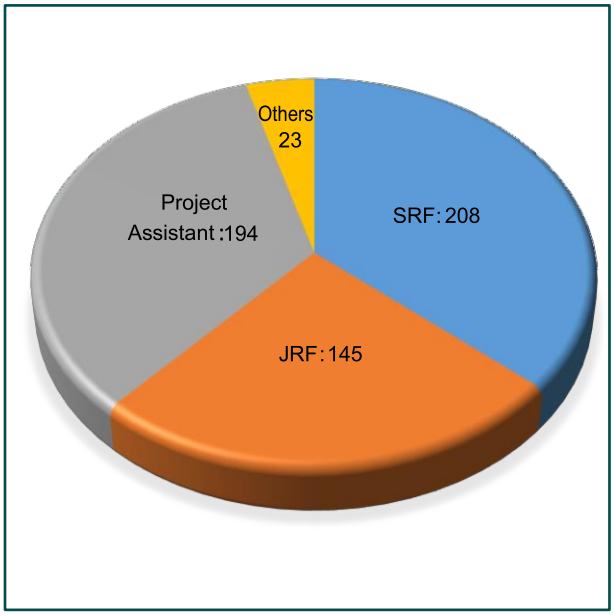
Area-wise strength of Scientists



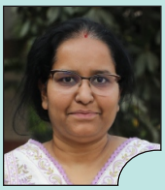
Designation-wise strength of Scientists



Research Fellows & Project Staff (570)



Welcome to the newly Recruited staff



Dr. Vineeta Rai
Senior Scientist
Sophisticated Analytical Instrument Facility and Research (SAIF&R)

Dr. Varun Kushwaha
Senior Scientist
Pharmaceutics & Pharmacokinetics

Dr. Satish Kumar Mudedla
Senior Scientist
Medicinal and Process Chemistry

Dr. Mohammad Zeeshan
Senior Scientist
Molecular Microbiology & Immunology

Dr. Gorakhnath Rajaram Jachak
Scientist
Medicinal and Process Chemistry

Dr. Satish Chandra Philkhana
Scientist
Medicinal and Process Chemistry

Dr. Prem Prakash
Scientist
Molecular Microbiology & Immunology

Dr. Suresh Kumar Battina
Scientist
Business Development & IP Unit

Dr. Amol Bisen
Technical Officer
Sophisticated Analytical Instrument Facility and Research (SAIF&R)

Mr. Dineshkumar R
Technical Officer
Pharmaceutics & Pharmacokinetics

Ms. Sonia Verma
Technical Officer
Pharmaceutics & Pharmacokinetics

Mr. Abhinash Chand Bharti
Technical Officer
Pharmaceutics & Pharmacokinetics

Ms. Rati Kumari
Technical Officer
Computer Division

Mr. Zubair Nizami
Technical Officer
Computer Division

Mr. Abhinav Kumar Sharma
Technician (I)
Scientific Directorate

Ms. Neha Singh
Technician (I)
Academic Affairs Unit

Mr. Sawan Kumar
Technician (I)
Business Development & IP Unit

Mr. Sanjay
Driver

Mr. Aman
Driver

Mr. Sumit Arya
Driver

Welcome to the newly Recruited staff

Mr. Ravi Rana
Assistant Section Officer
E-II Section

Mr. Neelesh Kumar Jareda
Assistant Section Officer
General Section

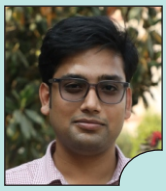
Mr. Amit Kumar Singh
Assistant Section Officer
E-I Section

Mr. Akshay Mishra
Assistant Section Officer
Vigilance Section

Mr. Saurabh
Assistant Section Officer
General Section

Mr. Mayank Mishra
Assistant Section Officer
Store & Purchase Section

Mr. Anil Kumar Dudi
Assistant Section Officer
Store & Purchase Section

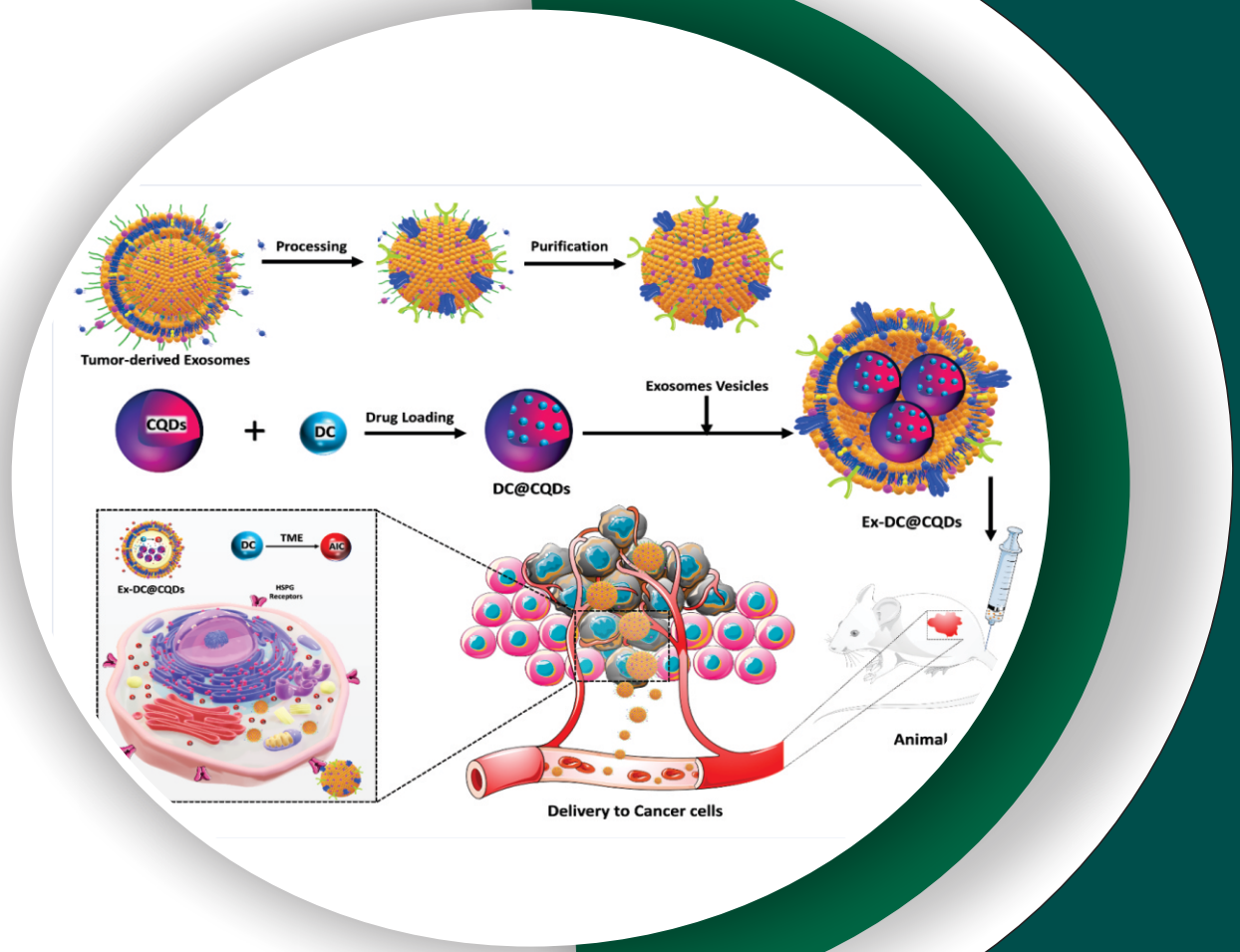


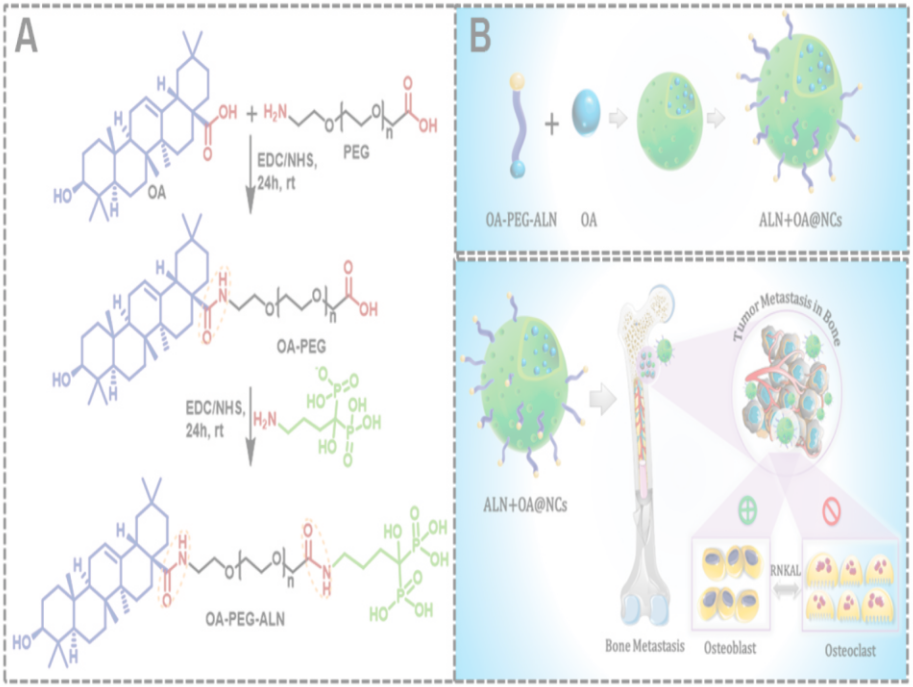
Mr. Manglik Anand
Assistant Section Officer
Store & Purchase Section

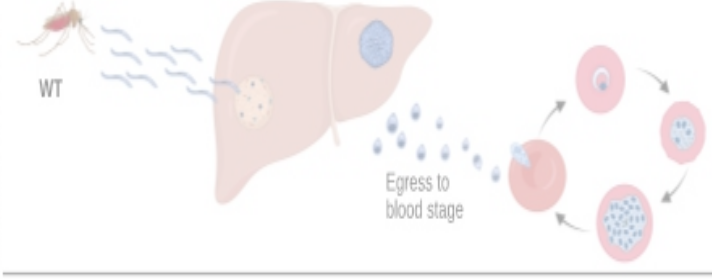
Welcome to the Newly Joined Research Scholars

Section I

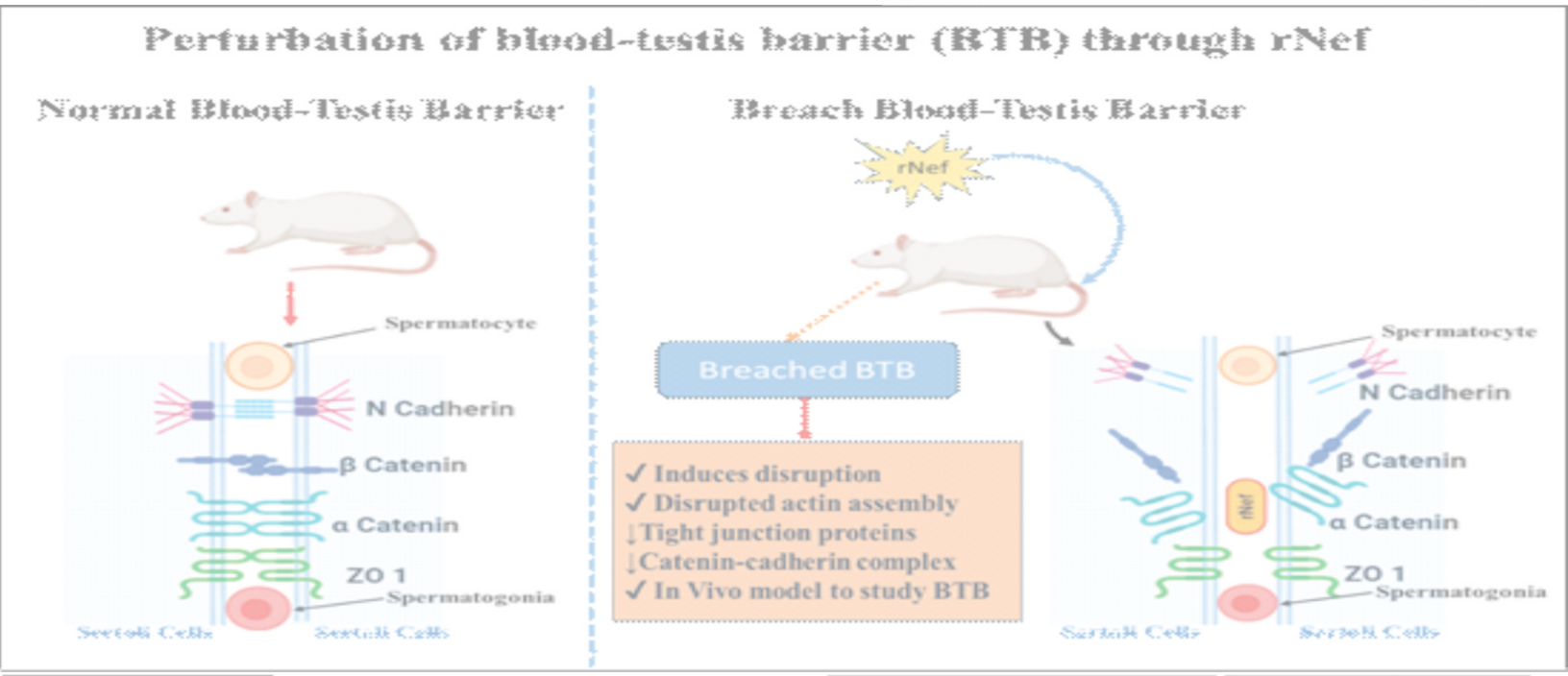
Progress in Thrust Areas of Research

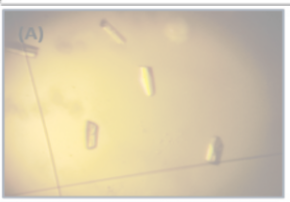


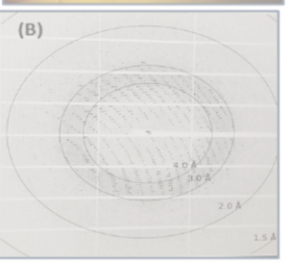

A
OA
PEG
EDC/NHS,
24h, rt
OA-PEG
EDC/NHS,
24h, rt
OA-PEG-ALN
B
OA-PEG-ALN
OA
ALN+OA@NCs
ALN+OA@NCs
Tumor Metastasis in Bone
RNKAL
Bone Metastasis
Osteoblast
Osteoclast

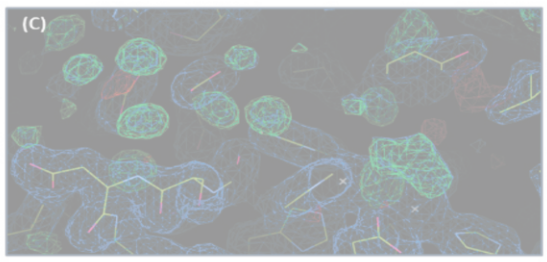

WT
Egress to
blood stage

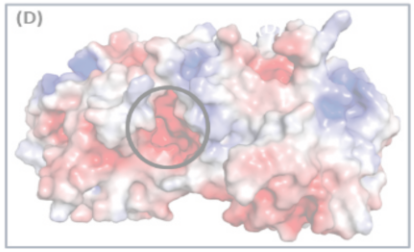

Scot1 KO
Late liver stage arrest
Scot1 GAP vaccine
Sporozoite challenge
Sterile protection

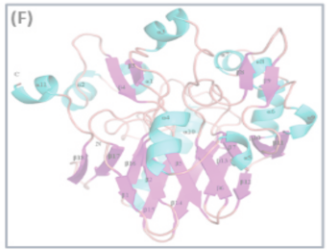

Perturbation of blood-testis barrier (BTB) through rNef
Normal Blood-Testis Barrier
Spermatocyte
N Cadherin
β Catenin
α Catenin
ZO 1
Spermatogonia
Sertoli Cells
Sertoli Cells
Breach Blood-Testis Barrier
rNef
Breached BTB
✓ Induces disruption
✓ Disrupted actin assembly
↓Tight junction proteins
↓Catenin-cadherin complex
✓ In Vivo model to study BTB
Spermatocyte
N Cadherin
β Catenin
rNef
α Catenin
ZO 1
Spermatogonia
Sertoli Cells
Sertoli Cells

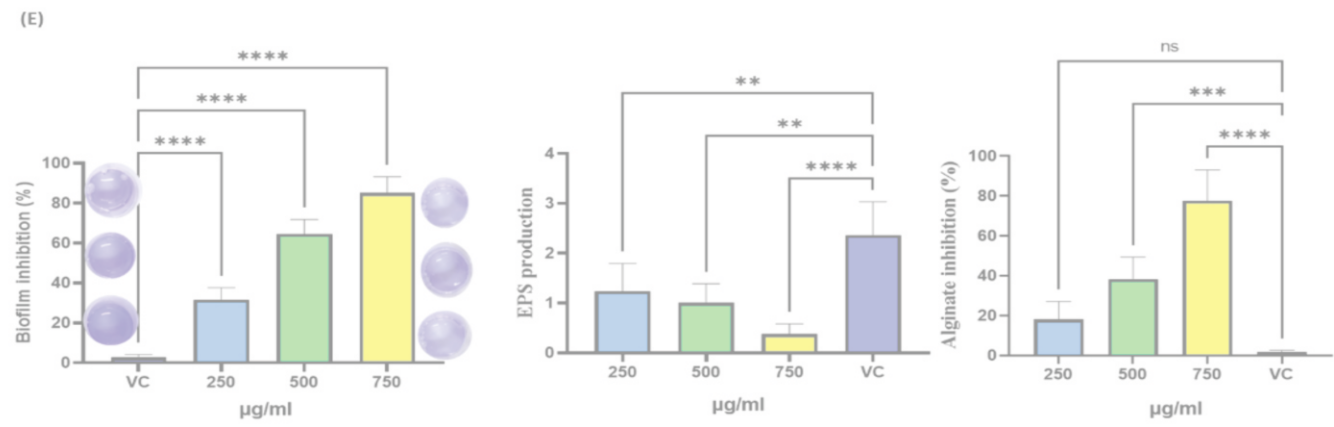

(A)


(B)


(C)


(D)


(F)


(E)
Biofilm inhibition (%)
VC
250
500
750
μg/ml
EPS production
250
500
750
VC
μg/ml
Alginate inhibition (%)
ns
250
500
750
VC
μg/ml

1 Regulatory Studies and Translational Research

Vision :

To deliver high quality and reliable preclinical regulatory data and pioneer advancements that accelerates the translation of scientific discoveries

Goals :

- To establish a cGMP facility for pilot-scale production of pharmaceutical formulations and National Clinical Trial Batch Production Facility under CRTDH program
- To extend the scope of GLP certified test facility for preclinical studies in animals required for pharmaceuticals
- Set up a center wherein activities related to a Drug Testing Lab (DTL) and bioanalytical center for analysis of samples for studying pre-clinical and clinical pharmacokinetics (PK)
- Formulations of CSIR-CDRI new drug candidates and novel drug delivery systems in the thrust areas of CSIR-CDRI
- Generate IND-enabling data for CSIR-CDRI leads as per regulatory requirements
- Development of platform for immuno toxicology assessment for biologics, phyto-pharmaceuticals including *in silico* platform for toxicity studies
- Reducing/ refining and replacement of the use of animals for regulatory purposes (use of 3R) and the development of the *in vitro* tools and techniques for risk assessment
- Clinical Trials and BA/BE studies: Strengthening the linkages with Clinical Trial Centers (KGMU Lucknow, KEM Hospital Mumbai, PGI Chandigarh) especially Clinical Trial Unit for conduct of Phase I Clinical Trials and BA/BE studies at KGMU, Lucknow

Coordinators of TRG (L to R): Dr. Aamir Nazir, Dr. Akhilesh Kumar Tamrakar, Dr. Sanjay Batra, Dr. Naibedya Chattopadhyay, Dr. Radha Rangarajan, Chairperson, Dr. S. K. Rath, Dr. Prabhat Ranjan Mishra, Dr. Manoj Kumar Barthwal

1.1 Regulatory Pharmacokinetic studies and formulation development

1.1.1 Generation and Compilation of Data Required for Regulatory Approval

Documentation of the physicochemical properties of drug candidates and formulations was carried out in the format specified by the New Drugs and Clinical Trial Rules, 2019. Regulatory data on specifications of physico-chemical properties (Chemistry, Manufacturing and Controls, CMC) of CSIR-CDRI candidate drugs: S-019-0277, S-024-0080, S-024-0178, SB-CDRI4-105, S-023-1070, S-016-1348, S-022-0476, S-024-0513, S-024-0794, and Minoxidil while One sample of Ormeloxifene (received from HLL Life Care) were compiled.

1.1.2 Development, Validation and Deployment of Methods of Pharmaceutical Analysis

Analytical methods were developed and validated according to the New Drugs and Clinical Trials Rules, 2019, for several new as well as known drugs. In this quarter, pharmaceutical analysis of different kinds of samples of synthetic compounds, plant products and industrial production batches were analyzed. In addition, formulation development and analysis of 06 different samples were carried out under GLP. Another set of nearly 200 samples were analysed for drug content, content uniformity, drug release, stability and impurity profiling in formulation development activities.

Centinhale- Inhalable Particles Containing Anti-Tuberculosis Agents

Form CT-10 was submitted at the NSWS portal. Permission to manufacture for *Academic* Clinical Trial was not forthcoming. The Drugs Controller-General of India was consulted, and advised filing for a *Regulatory* Clinical Trial. The necessary Form CT-04 was prepared. ICMR Project Monitoring Committee suggested that the corresponding Form CT-10 should be filed by a manufacturer who has already received corresponding Form CT-11 Permissions to manufacture in the past. After extensive survey, a party located in Ahmedabad was identified. A collaboration agreement between CSIR-CDRI and this entity is being negotiated, and CSIR-CDRI will transfer the technology to the manufacturing premises shortly. A modified Form CT-04 will be filed after technology transfer is completed. I

S-022-0807 (Anti-leishmanial)

HPLC analysis was conducted using a Waters HPLC system with a UV detector. The mobile phase, operated in gradient mode, comprised 0.1% formic acid in water and acetonitrile, with a flow rate of 1 mL/min. Separation was performed on an XBridge™ C18 column (5µm, 250×4.6mm) at 35°C, with detection at 260 nm. The retention time was found to be 9.33 min. Stability studies in simulated gastric fluid (SGF) and simulated intestinal fluid (SIF) revealed that the compound remained stable in SGF, while approximately 14% degradation occurred in SIF. The bioanalytical method development is ongoing, and pharmacokinetic studies will be initiated soon.

N-012-0006 (Anti-diabetic)

The LC-MS/MS analysis was performed using a Vanquish TSQ-ALTIS instrument with a precursor ion of m/z 102.115 and a product ion of m/z 74.137. The isocratic mobile phase consisted of 0.1% formic acid in water and methanol (30:70), with a 0.4 mL/min flow rate. Separation was achieved using a Waters Symmetry C18 column (5µm, 4.6×150 mm) at 40°C. The retention time was found to be 2.71 min. The bioanalytical method development is ongoing, and SIF/SGF stability and pharmacokinetic studies will be initiated soon.

S-024-1153 (Pain)

HPLC analysis was conducted using a Waters HPLC system with a UV detector. The

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Director &
Chairperson, Translational
Research Group

mobile phase, operated in gradient mode, comprised 0.1% formic acid in water and acetonitrile, with a flow rate of 1 mL/min. Separation was performed on an XBridge™ C18 column (5µm, 250×4.6 mm) at 35°C, with detection at 269 nm. The retention time was found to be 6.731 min. The solubility of the compound was found to be below the detection level.

S-024-0665 (Pain)

HPLC analysis was performed using a Waters HPLC system with a UV detector in gradient mode, with water and acetonitrile as the mobile phase at a 1 mL/min flow rate. Separation was achieved on an XBridge™ C18 column (5µm, 250×4.6 mm) at 35°C, with detection at 334 nm and a retention time of 12.021 min. The compound was found to be stable in both simulated gastric (SGF) and intestinal fluids (SIF). The Protein precipitation method was used for the extraction of the compound from the plasma matrix and achieving a recovery of over 80%.

LC-MS/MS analysis was conducted using a Shimadzu 8050 instrument with a precursor ion of m/z 277.110 and a product ion of m/z 110.800. The isocratic mobile phase consisted of 0.1% formic acid in water and 0.1% formic acid in methanol (20:80) at a 0.6 mL/min flow rate. Separation was carried out using a Waters Sunfire C18 column (5µm, 4.6×250 mm) at 40°C, with a retention time of 5.12 min. the microsomal stability is ongoing, and the pharmacokinetics studies will be initiated soon.

***Acorus calamus* extracts (Parkinson's Disease)**

Loss on Drying analysis showed that the compound's moisture content ranged from 2.79% to 4.80%. Analytical method development is ongoing, while bioanalytical method development and formulation development will be initiated soon.

S-016-1271 (Antimicrobial)

Analytical method development is ongoing, while bioanalytical method development, pH-dependent stability, plasma stability, and pharmacokinetics studies will be initiated soon.

Chebulinic Acid Enriched Fraction (CAEF) (Benign Prostatic Hyperplasia)

HPLC analysis was conducted using a Waters HPLC system with a UV detector in gradient mode. The mobile phase consisted of 0.1% formic acid in water and acetonitrile (95:5 v/v) along with acetonitrile, at a flow rate of 1.5 mL/min. Separation was performed on a Sanctuary C18 (2) column (250×4.6 mm, 5µm) from Elegance Life Sciences at 35°C, with detection at 280 nm. The retention times of key compounds in CAEF were gallic acid (4.625 min), chebulagic acid (21.88 min), ellagic acid (23.47 min), and chebulinic acid (26.65 min). The major compounds identified were ellagic acid (8.74%) and chebulinic acid (73.42%).

Stability studies of the API and tablets were conducted as per ICH guideline Q1A(R2). Chebulinic acid remained stable at 40°C ± 2°C/75% RH ± 5% RH compared to storage at 30°C and 25°C with relative humidity in both API and tablets. The percentage content of ellagic acid was found to be stable across all conditions in both API and tablet formulations.

1.1.3 New Formulations

Dry Powder Inhalation of Favipiravir

Dry Powder Inhalation (DPI) formulations of the directly acting antiviral agent (DAA), favipiravir, were prepared using conventional excipient (lactose) carrier particles. DPIs are especially apt for treating airborne viral infections such as SARS-CoV-2 etc., because inhalation delivers the drug directly to the surface of the respiratory tract exposed to air. Other routes of administration call for the DAA to appear on this external surface by seeping through the blood supply in the vicinity. We measured the amounts of favipiravir present at different times in the lumen of the lungs and airways after dosing with DPI or oral administration. The Figure below shows that comparable concentrations were achieved

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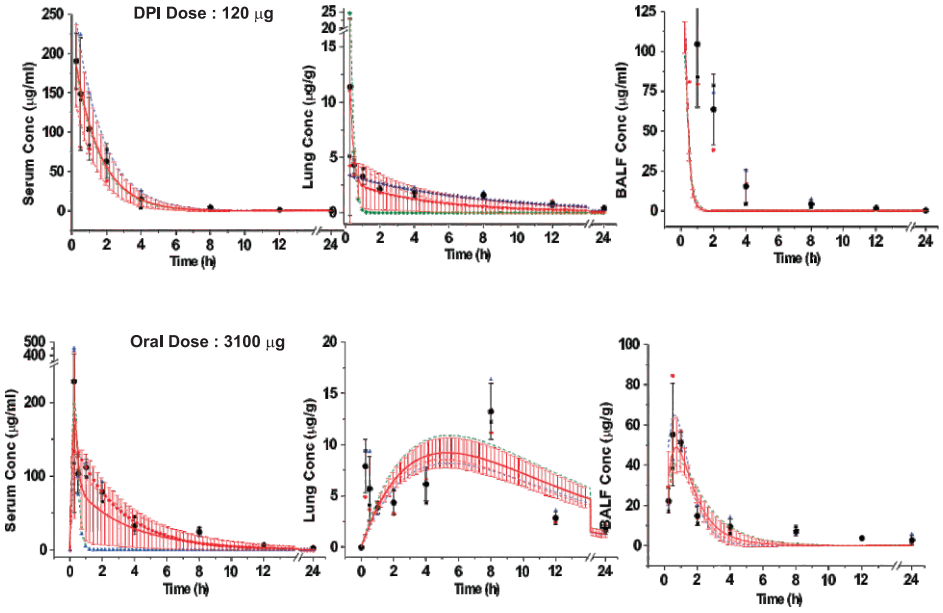
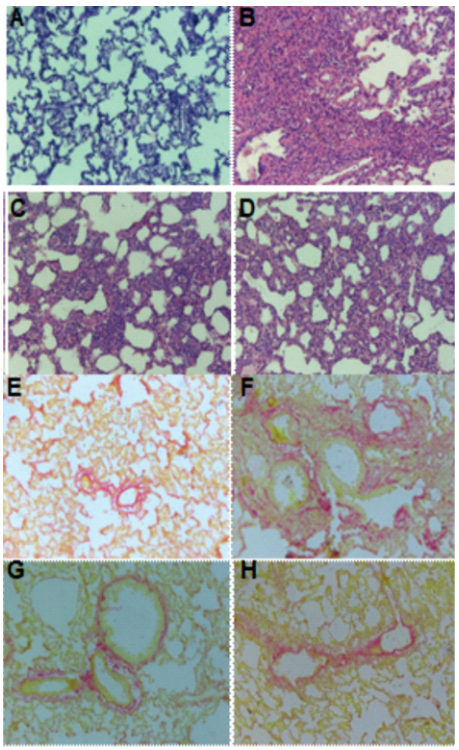
Research Group



in the lungs and the fluid recovered from the lungs and airways (BALF) with ~200 micrograms of favipiraver administered as a DPI *versus* ~3000 micrograms dosed orally. Additionally, blood circulation and other organs were spared exposure to this toxic drug. **(Pharm Res. 2024 Nov; 41(11):2189-2198. doi: 10.1007/s11095-024-03782-3).**

Dry Powder Inhalation of Nintedanib

The incidence of idiopathic pulmonary fibrosis (IPF) or interstitial lung disease (ILD) leading to consolidation of lung tissue is anecdotally on the rise. The anti-cancer agent nintedanib is reported in the literature to benefit patients of these conditions. We made DPIs containing nintedanib using the conventional excipient lactose, and a novel excipient: dibasic calcium phosphate. The latter is significantly cheaper, and provides comparable results in terms of powder flow and aerosol properties. We compared nintedanib pharmacokinetics and efficacy of the novel excipient formulation against bleomycin-induced pulmonary fibrosis following oral (3.875 mg/q12h) and DPI (200 g/12h) dosing in rats. Drug remaining in the lungs and airways at the end of 12 hours of dosing with the DPI was nearly double the amount remaining after oral dosing. Lung fibrosis induced in rats using bleomycin was resolved equally well by the two interventions administered every 12 hours for 14 days.



Hematoxylin-Eosin (***A-D***) and Picrosirius Red stained (***E-H***) lung sections from animals in the normal control (***A, E***), untreated control (***B, F***), orally dosed (***C, G***) and DPI dosed (***D, H***) groups show extents of histopathology and collagen deposition.

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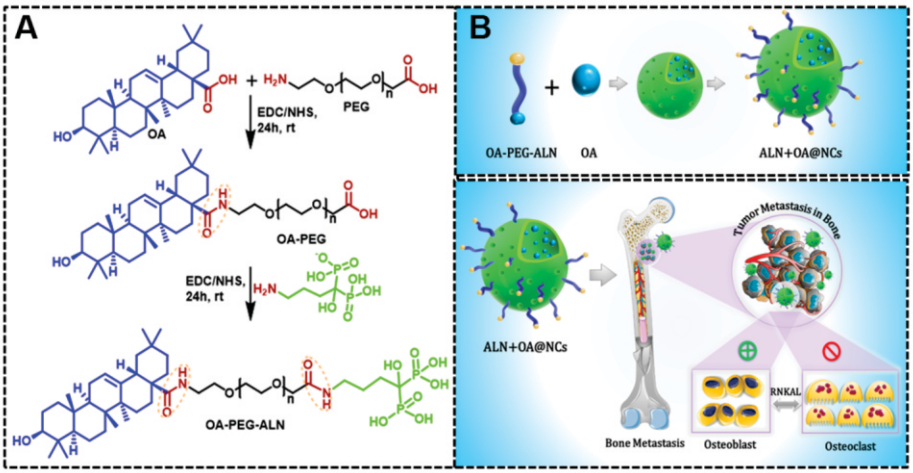
Research Group

Alendronate-Functionalized Porous Nano-Crystalsomes Mitigate Osteolysis and Consequent Inhibition of Tumor Growth in a Tibia-Induced Metastasis Model

Bone is one of the most prevalent sites of metastases in various epithelial malignancies, including breast cancer and this metastasis to bone often leads to severe skeletal complications in women due to its osteolytic nature. To address this, we devised a novel drug delivery approach using an Alendronate (ALN) functionalized self-assembled porous crystalsomes for concurrent targeting of Oleanolic acid (OA) and ALN (ALN + OA@NCs) to bone metastasis. Initially, the conjugation of both PEG-OA and OA-PEG-ALN with ALN and OA was achieved, and this conjugation was then self-assembled into porous crystalsomes (ALN + OA@NCs) by nanoemulsion crystallization. The reconstruction of a 3D single particle using transmission electron microscopy ensured the crystalline porous structure of ALN + OA@NCs, was well aligned with characteristic nanoparticle attributes including size distribution, polydispersity, and zeta potential. Further, ALN + OA@NCs showed enhanced efficacy in comparison to OA@NCs suggesting the cytotoxic roles of ALN towards cancer cells, followed by augmentation ROS generation (40.81%), mitochondrial membrane depolarization (57.20%), and induction of apoptosis (40.43%). We found that ALN + OA@NCs facilitated inhibiting osteoclastogenesis and bone resorption followed by inhibited osteolysis. *In vivo* activity of ALN + OA@NCs in the 4 T1 cell-induced tibia model rendered a reduced bone loss in the treated mice followed by restoring bone morphometric markers which were further corroborated bone-targeting effects of ALN + OA@NCs to reduce RANKL-stimulated osteoclastogenesis. Further, *In vivo* intravenous pharmacokinetics showed the improved therapeutic profile of the ALN + OA@NCs in comparison to the free drug, prolonging the levels of the drug in the systemic compartment by reducing the clearance culminating the higher accumulation at the tumor site. Our finding proposed that ALN + OA@NCs can effectively target and treat breast cancer metastasis to bone and its associated complications.

Dacarbazine-Primed Carbon Quantum Dots Coated with Breast Cancer Cell-Derived Exosomes for Improved Breast Cancer Therapy

Exo expedite the conveyance of DC@CQDs to cancer cells by fusing with the cell membrane and facilitating the activation of DC specifically within cancer cells. Exo released by BC cells contain specific proteins (heparanase, syndecan-1, and glypican-1) that bind to HSPG receptors, accenting the involvement of the



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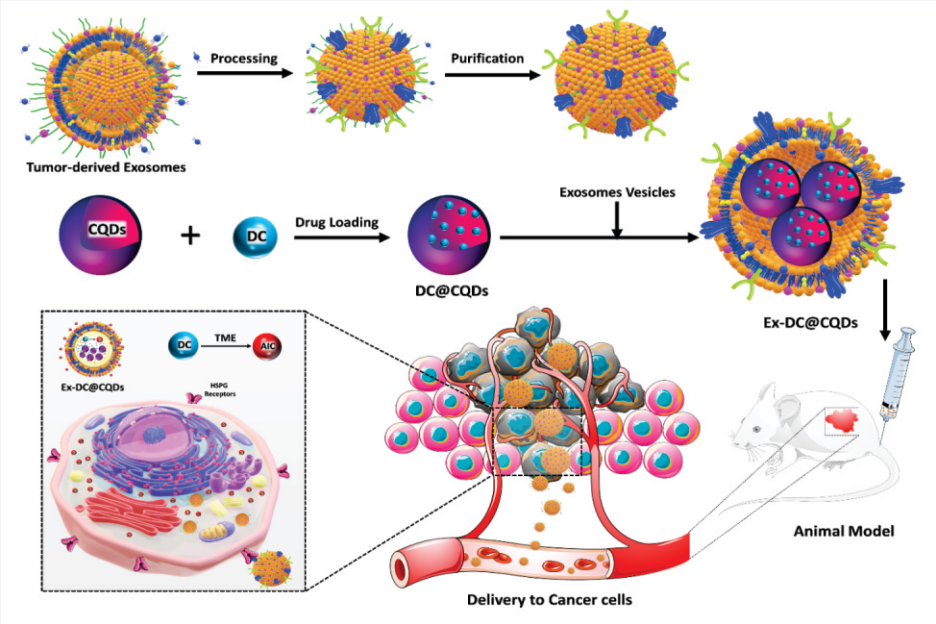
Coordinator, Translational
Research Group



receptor in essential cellular processes. The interaction between Exo and HSPG receptors triggers an internalization process mediated by endocytosis. This enables efficient delivery of exosomal cargo, including drugs, proteins, and nucleic acids, to the target cells, ensuring a targeted therapeutic approach. In addition, Exo isolated from BC cells are innately endowed with the capacity to express these vital cytochrome enzymes, which will facilitate activation of DC, negating the prerequisite for enzyme presence on the surface of cancer cells. Therefore, it was hypothesized that cytochrome enzymes, particularly CYP1A1, CYP1A2, and CYP2E1, being integral parts of the Exo would facilitate direct activation of DC within the tumor microenvironment (TME) after HSPG-mediated spatial targeting of Ex-DC@CQDs into tumor cells, thereby engendering improved efficacy while minimizing untoward effects on normal cells. Thus, Exo co-loaded with CQDs and DC can provide significant therapeutic effects against BC while avoiding the many risks associated with the free DC. Moreover, Exo possess an intrinsic ability to cross biological barriers, enabling them to encounter the phagocytosed drug lost during circulation. To achieve this, we have successfully developed an exosome-derived bioengineered quantum dots-based system to address the issue of complicated imprecise targeting that often leads to clinical toxicity with breast cancer therapy. We devised a strategy that involved loading DC into Fucose-based CQDs, which were then coated with cancer cell isolated Exo, resulting in Ex-DC@CQDs. The studies confirmed the formation and characteristics of the CQDs and demonstrated that the Exo retained their structural and functional properties within the system. The use of Exo facilitated the targeted delivery of the DC@CQDs to cancer cells through HSPG receptors, thereby enhancing therapeutic efficacy. The study showed that Ex-DC@CQDs exhibited precise targeting and increased cellular uptake, and induced cell death in BC cells through the generation of ROS, depolarization of MMP, and apoptosis. *In vivo* imaging demonstrated sustained fluorescence intensity at the tumor site, indicating efficient targeting through the exosome-mediated HSPG receptor-driven cell uptake. Additionally, the study evaluated the pharmacokinetic profile and antitumor efficacy of Ex-DC@CQDs compared to free DC and DC@CQDs. The results revealed a significant increase in the AUC0-∞ and a substantial reduction in tumor weight in the Ex-DC@CQDs-

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& Coordinator,, Translational
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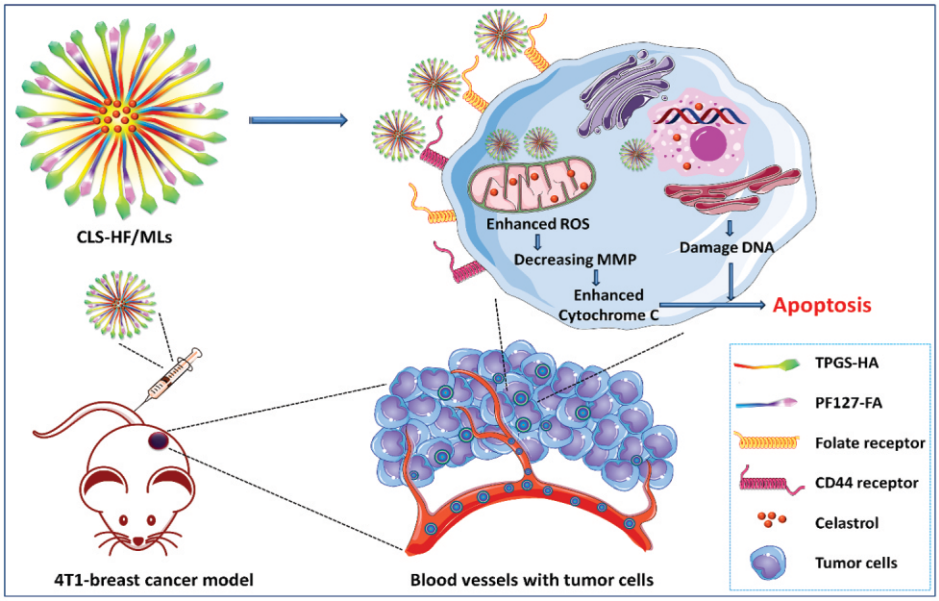
treated group, indicating improved pharmacokinetics, higher tumor accumulation, and sustained release of the carrier. Overall, our findings feature the potential of exosome-specific targeting and DC@CQD-mediated delivery as an effective intervention for BC. The use of Exo as nanocarriers offers advantages such as precise targeting, enhanced therapeutic efficacy, and reduced toxicity, facilitating the development of a new approach to biologically sourced nanocarriers for cancer targeting.

Celastrol-Loaded Polymeric Mixed Micelles Shows Improved Antitumor Efficacy in 4 T1 Bearing Xenograft Mouse Model through Spatial Targeting

In this study, we have proposed a novel approach that combines hyaluronic acid (HA), folic acid (FA), and celastrol (CLS) within a polymeric micelle system (CLS-HF/MLs), offering a dual-action strategy against breast cancer. Polymeric mixed micelles were prepared through the thin-film hydration method, and comprehensive quality control parameters were established, encompassing particle size, polydispersity index, zeta potential, surface morphology, encapsulation efficiency, drug content, *in vitro* drug release, and storage stability assessment. The average particle size of CLS-HF/MLs micelles was found to be 120 nm and their drug loading and encapsulation efficiencies were 15.9 % and 89.52 %, respectively. The *in vitro* release data showed that the CLS-HF/MLs targeted mixed micelles displayed a prolonged release profile compared to the free drug. Additionally, the stability of the developed polymeric mixed micelles was maintained for up to 8 weeks of storage in terms of particle size and drug content. Furthermore, both flow cytometry and confocal laser scanning microscopy studies indicated a significant enhancement in the cellular uptake efficiency and cytotoxicity of CLS-HF/MLs mixed micelles against MCF-7 cell line. In terms of pharmacokinetic analysis, the half-life and AUC values of CLS-HF/ MLs mixed micelles were found to be approximately 4.71- and 7.36-folds higher than the values of free drug (CLS), respectively. The CLS-HF/MLs micelles exhibited remarkable antitumor efficacy (almost complete ablation of the 4 T1-cell bearing tumor xenografts mouse model) due to the dual receptor (CD44 and folate) targeting effects with minimal side effects. When considering the cumulative findings of our present research, it becomes evident that mixed micelles designed for chemotherapy offer a promising and potentially effective therapeutic avenue for the treatment of breast cancer



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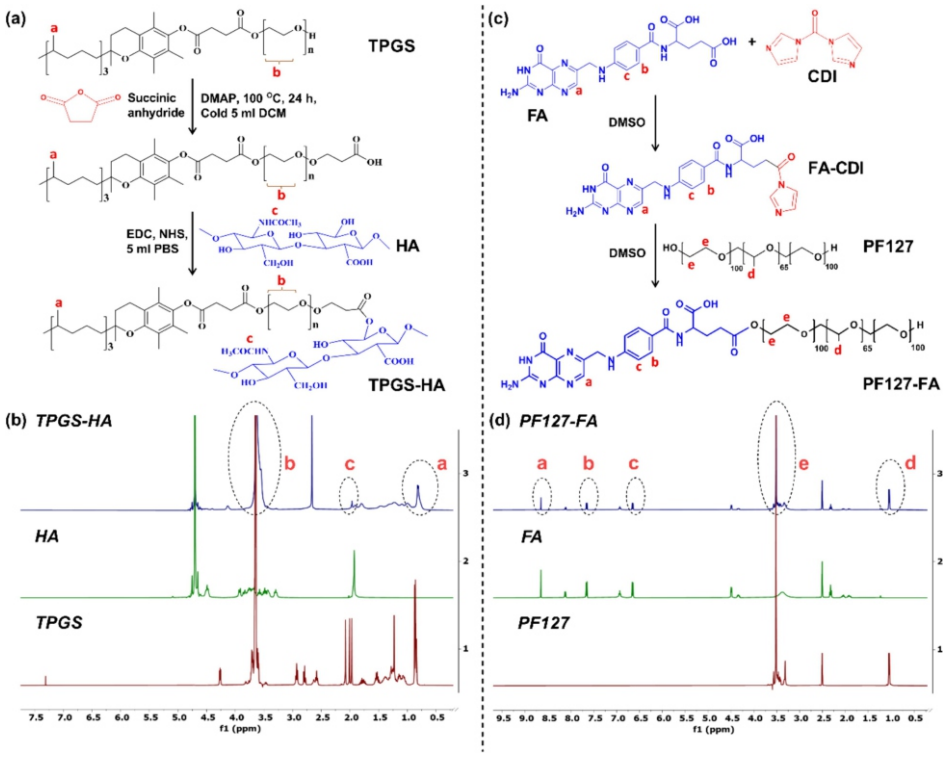

Intratumoral Depot-Forming Lyotropic Liquid Crystal System for Synchronized Codelivery of Chemotherapeutics in Breast Cancer Treatment

Combination chemotherapy remains the standard approach for cancer treatment, with the optimization of drug ratios playing a crucial role in maximizing therapeutic efficacy. Herein, an injectable *in situ* depot-forming lipidic lyotropic liquid crystal (L3C) system was developed for synchronized intratumoral codelivery of chemotherapeutics. The L3C system, composed of monoolein, phosphatidylcholine, tocopherol acetate, and d-⊠-tocopherol polyethylene glycol 1000 succinate, allows for the simultaneous encapsulation of hydrophilic and hydrophobic drugs. Doxorubicin and paclitaxel were selected as model chemotherapeutics and co-loaded at an optimized synergistic ratio. The

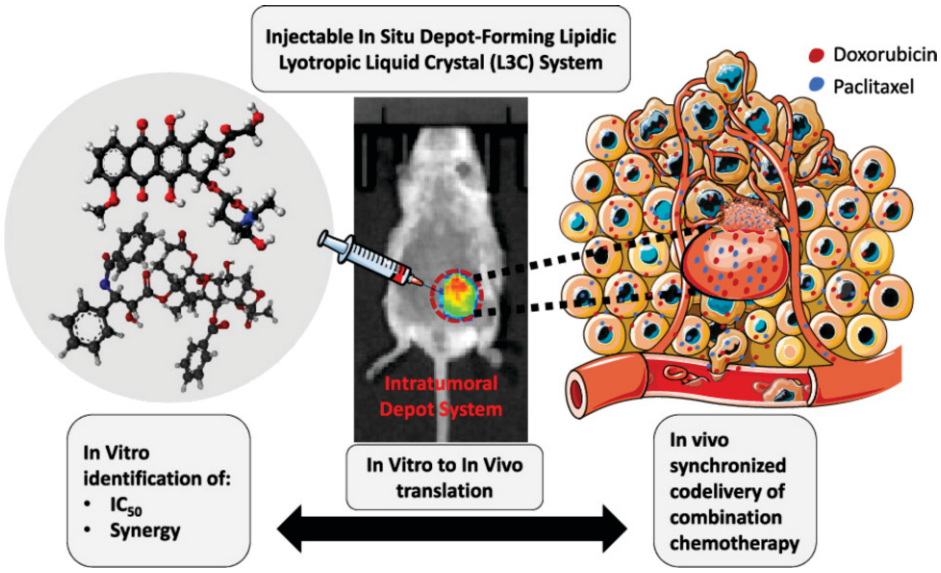

Figure: Schematic representation of the injectable *in situ* depot-forming lipidic lyotropic liquid crystal (L3C) system for synchronized codelivery of chemotherapeutics

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& Convener, Translational
Research Group

L3C formulation, initially a low-viscosity injectable fluid, transformed into a hexagonal mesophase depot system upon intratumoral injection, enabling sustained drug release for over a month. In the 4T1 breast tumor model (BALB/c mice), the L3C system facilitated synchronized codelivery of chemotherapeutics, resulting in enhanced antitumor efficacy and reduced cardiotoxicity compared to conventional intravenous administration or unsynchronized combinations. Pharmacokinetic and biodistribution studies demonstrated prolonged intratumoral drug retention, while histological analysis confirmed the biocompatibility of the formulation. The findings suggest that the L3C system provides a promising platform for precise, localized, and sustained intratumoral chemotherapy, offering an advanced strategy to improve combination cancer therapy.

Development of a pH-Sensitive Double-Shelled Magnetic Nanoparticle System for Targeted Breast Cancer Therapy

Iron-deficient premenopausal women face an increased risk of breast cancer, necessitating advanced therapeutic strategies. While magnetic nanoparticles (MNPs) hold promise for cancer treatment, their clinical translation is limited due to pharmacokinetic challenges, biocompatibility concerns, and unstable magnetic properties. To address these limitations, a double-shelled magnetic nanoparticle system (DOX-RA-MNP) was developed for the pH-sensitive delivery of Retinoic acid and Doxorubicin using an immunomodulatory polymeric approach. The formulation was optimized through a QbD framework, achieving ideal size, polydispersity index, zeta potential, and enhanced doxorubicin loading. The system exhibited sustained drug release, with accelerated release in the tumor microenvironment. *In vitro* studies on MDA-MB-231 cells demonstrated improved cytotoxicity, enhanced cellular uptake, G2 phase cell cycle arrest, mitochondrial membrane depolarization, and inhibition of PgP protein. *In vivo* evaluation revealed significant tumor regression, favorable pharmacokinetics, targeted biodistribution, and improved safety, with reduced hemolysis and enhanced survival rates. Biochemical analyses highlighted the role of ferroptosis in increasing reactive oxygen species levels and promoting immunomodulatory effects. These findings indicate that the DOX-RA-MNP system effectively enhances drug localization, minimizes systemic toxicity, and presents a promising approach for breast cancer treatment.

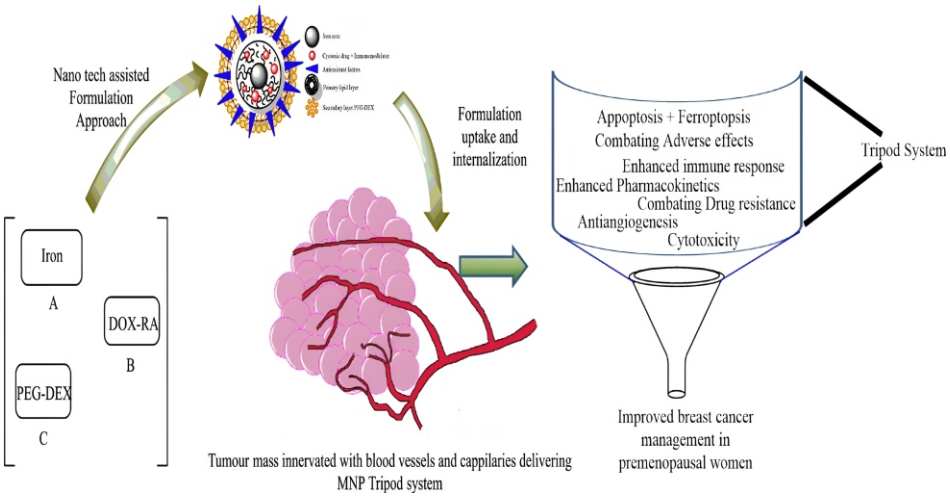

Figure: Schematic representation of the double-shelled magnetic nanoparticle (MNP) system for breast cancer therapy

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Senior Principal Scientist & Convener, Translational Research Group

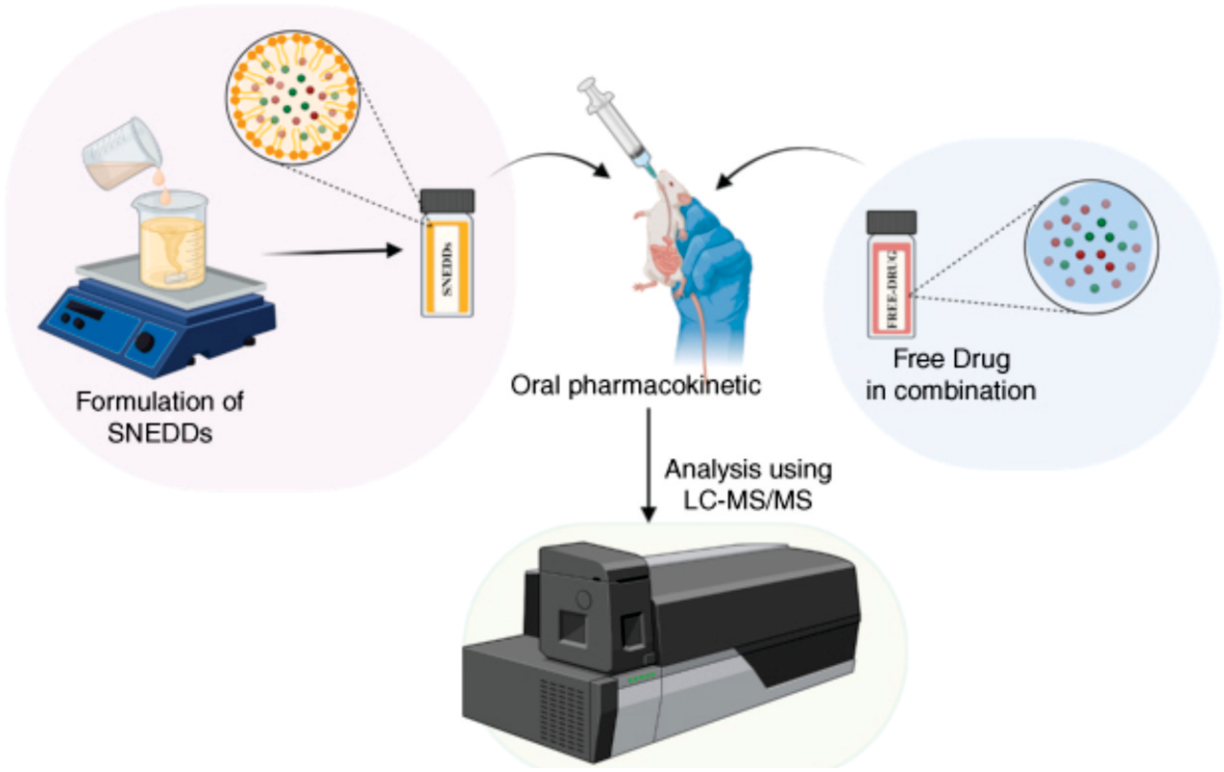

Figure: Schematic representation of SNEDDs formulation, oral pharmacokinetic evaluation, and LC-MS/MS analysis for DOX-BAC combination therapy

Combinatorial Nanoformulation of Doxorubicin and Baicalein: Enhancing Breast Cancer Therapy While Mitigating Cardiotoxicity

The combinatorial delivery of Doxorubicin (DOX) and Baicalein (BAC) offers a promising approach to enhance breast cancer therapy while mitigating DOX-induced cardiotoxicity. However, optimizing their co-delivery remains a challenge. In this study, a nanoformulation encapsulating DOX and BAC was developed using a quality by design (QbD) approach and validated following USFDA guidelines. The optimized formulation exhibited a particle size of 162.56 ± 2.21 nm, a polydispersity index of 0.102 ± 0.03, and a zeta potential of -16.5 ± 1.21 mV, ensuring stability and effective drug entrapment. Pharmacokinetic evaluation using LC-MS/MS demonstrated significantly enhanced bioavailability, with DOX-BAC-SNEDDs exhibiting higher AUC_{0-t} values (6128.84 ± 68.71 and 5896.62 ± 99.31 ng/mL/h) compared to the DOX-BAC suspension. These results suggest that the nanoformulation improves drug absorption and circulation time, potentially leading to better therapeutic efficacy and reduced toxicity. The findings support the advancement of DOX-BAC nanoformulations for breast cancer treatment and underscore their potential for therapeutic drug monitoring in clinical settings.

Paclitaxel-Bortezomib Nanoformulation: A Synergistic Approach for Breast Cancer Therapy

The combination of paclitaxel (PTX) and bortezomib (BTZ) presents a promising strategy for breast cancer treatment. To enhance therapeutic efficacy and overcome pharmacokinetic limitations, a nanoformulation of PTX-BTZ was optimized using the Box-Behnken Design (BBD) and validated following US-FDA guidelines. The formulation exhibited a particle size of 133.9 ± 1.97 nm, a polydispersity index of 0.19 ± 0.01, and a zeta potential of -19.20 ± 1.36 mV, ensuring stability and efficient drug encapsulation. Pharmacokinetic studies revealed significantly higher Cmax values for PTX-BTZ-NE (313.75 ± 10.71 ng/ml for PTX and 11.92 ± 0.53 ng/ml for BTZ) compared to the free drug combination (104 ± 13.06 ng/ml PTX and 1.9 ± 0.08 ng/ml BTZ), indicating improved bioavailability and drug retention. Multiple reaction monitoring transitions were optimized for precise quantification using an LC-MS/MS system with a C18 Luna column and an elution system of 0.1% formic acid in methanol:10 mM ammonium acetate. These findings highlight the potential of PTX-BTZ nanoformulation as a potent therapeutic strategy for breast cancer, warranting further exploration for clinical applications.

1.1.4 New Analytical Method Development

Development and Validation of an HPLC Method for Simultaneous Quantification of Rutin and Donepezil

A high-performance liquid chromatography method was developed and validated for the simultaneous quantification of rutin (RN) and donepezil (DNP), essential for their co-formulation in drug delivery systems. Chromatographic separation was achieved using a C18 column (Ø 150 × 4.6 mm) with a mobile phase comprising 0.1% formic acid aqueous solution and methanol (60:40 *v/v*) at a flow rate of 0.5 ml/min. The method demonstrated linearity, selectivity, accuracy, precision, and reproducibility, with a percent relative standard deviation (RSD) of less than 2%. The limits of quantification for RN and DNP were determined to be 3.66 and 3.25 µg/ml, respectively. Validated in accordance with ICH guidelines, this method effectively quantified RN and DNP co-loaded in DQAsomes

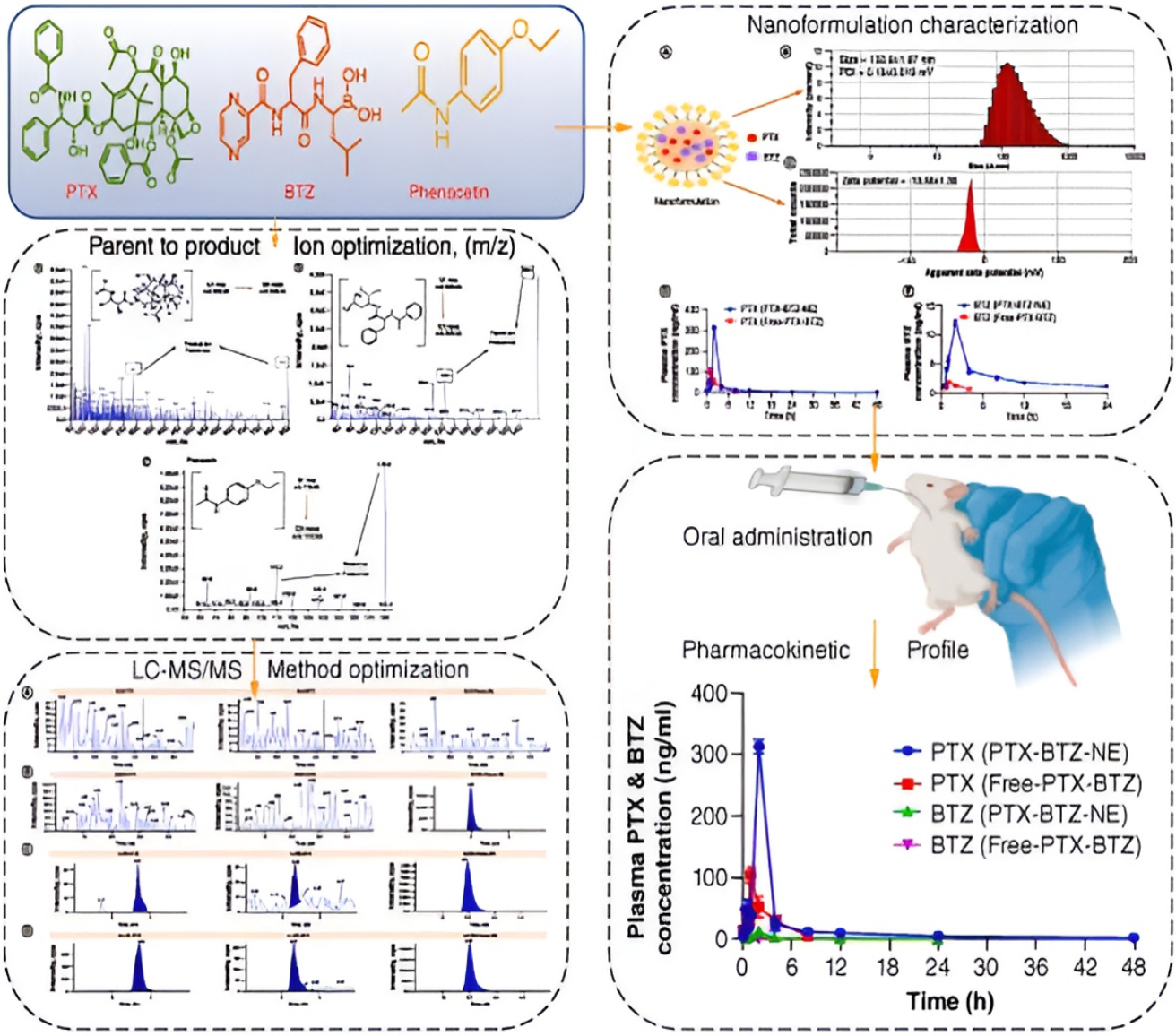

Figure: Schematic representation of PTX-BTZ nanoformulation optimization and pharmacokinetics

(121 nm), supporting the assessment of matrix effects, drug release profiles, entrapment efficiency, loading efficiency, and *in vivo* plasma kinetics. The developed method holds promise for the reliable analysis of RN and DNP in pharmaceutical formulations, aiding further research and development in neuroprotective therapeutics.

Simultaneous UHPLC-PDA Method Development and Validation for Quantification of Quercetin and Erlotinib: Application in Formulation Development and Pharmacokinetics

Combining anticancer drugs and phytomolecules with anticancer activity has opened up new avenues for cancer treatment and could be a potent alternative to conventional cancer therapy. Quercetin (QUR) and Erlotinib (ERB) exhibit potential anticancer properties. However, both drugs manifest low oral bioavailability due to low aqueous solubility, and interestingly, there is not a single validated UHPLC-PDA method for quantifying QUR and ERB simultaneously. Thus, this study aimed to address pharmaceutical challenges by encapsulating the two drugs in liquid crystalline nanoparticles (LCNPs) and to develop and validate a sensitive, accurate analytical, and bioanalytical method, as per ICH guidelines to quantify QUR and ERB simultaneously in LCNPs. Effective chromatographic elution of QUR and ERB has been achieved using a C8 reversed-phase column with an isocratic mobile phase composed of a mixture of acetonitrile and 10 mM potassium dihydrogen orthophosphate buffer with a pH 3.4 (40:60, v/ v), at a flow rate of 1 mL/min, and both drugs were detected at 252 nm wavelength. The retention time is 5.3 and 7.7 min for QUR and ERB, respectively, with a total analysis time of less than 10 min, ideal for characterization of the formulation containing both of these drugs, while LOQ is less than 0.5 µg/mL for both the drugs, appropriate for monitoring therapeutic drugs in preclinical and clinical research settings. Furthermore, the validated method was successfully applied to estimate the percent drug entrapment efficiency, percent drug loading, and *in vitro* cumulative drug release study for the simultaneous analysis of QUR and ERB in the formulation. The technique is also successfully used to investigate the simultaneous pharmacokinetic characteristics of both the drugs in Sprague Dawley rats. The results were deemed reliable, and the validated method was found to be precise and accurate as per ICH guidelines for the simultaneous estimation of QUR and ERB having application in formulation development and bioanalytical studies.

Development and Validation of an Analytical and Bioanalytical Method for Simultaneous Estimation of Anticancer Drug Gefitinib and Metformin Hydrochloride: Pharmaceutical Application

The proposed work envisages a simple, robust, and cost-efficient UHPLC method for the simultaneous estimation of Gefitinib and Metformin hydrochloride. The UHPLC method employs orthophosphoric acid for obtaining an optimized separation of both the drugs within a total runtime of 15 minutes. In conclusion, the developed method has been optimized and calculated for linearity, limit of detection and limit of quantification, system suitability, recovery, robustness, method precision, and intermediate precision, and shall further be validated as per ICH Q2 R1 guidelines for analytical method and US-FDA guidelines for bioanalytical method. The developed method is used for the quantification of gefitinib and metformin entrapped in nano vesicular formulation.

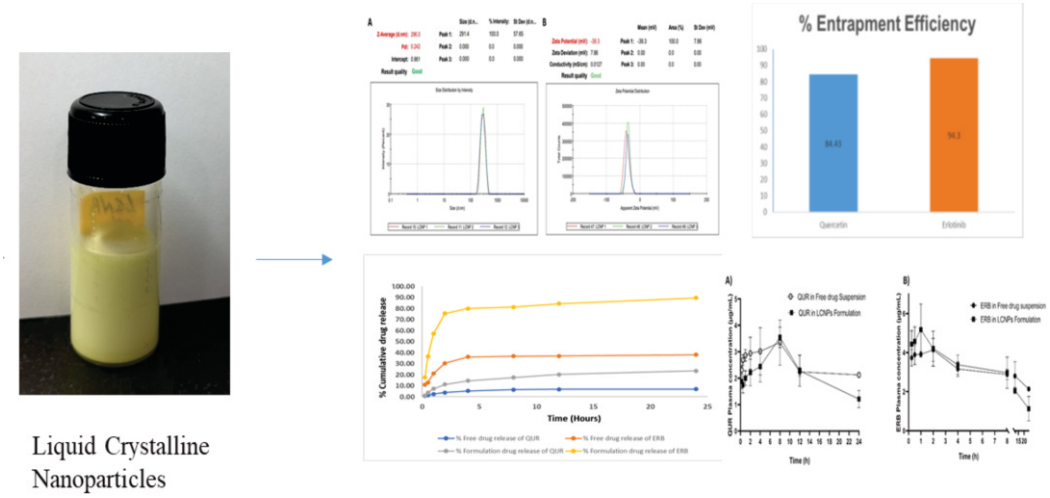

Figure: Simultaneous estimation of Quercetin and Erlotinib with application in formulation development and pharmacokinetics.

Simultaneous Estimation of Donepezil and Quercetin using UHPLC: Formulation, Pharmaceutical, and Pharmacokinetic Applications in Alzheimer's Disease

Alzheimer's disease (AD) remains the most prevalent form of dementia, affecting over 55.2 million individuals worldwide. Current treatments offer only symptomatic relief, emphasizing the need for novel combination therapies targeting multiple pathways. Donepezil (DNP), an acetylcholinesterase inhibitor, combined with Quercetin (QCT), a neuroprotective flavonoid, presents a promising strategy for modifying disease progression. However, the concurrent estimation of DNP and QCT necessitates a robust analytical method. Therefore, it was envisaged to develop a simple, cost-effective, and reproducible UHPLC method for the simultaneous quantification of DNP and QCT. Chromatographic separation was achieved using a Kromasil C18 column (4.6 × 250 mm) with a mobile phase of acetonitrile and 0.1% diethylamine buffer (pH 3.5) in a 50:50 *v/v* ratio, at a flow rate of 0.6 mL/min and a column temperature of 40°C. The analytes were detected using a PDA detector at 268 nm (DNP) and 370 nm (QCT) within a 10-minute run time. The method was validated as per ICH guidelines and successfully applied to quantify DNP and QCT in liposomal formulations, assessing entrapment efficiency, drug loading, and *in vivo* plasma kinetics.

LC-MS/MS Method for Quantification of Raspberry Ketone

Raspberry Ketone (RK), derived from red raspberry fruit (*Rubus idaeus*, Family-Rosaceae), is a reported potent anti-obesity agent. The study aims to method development, validation, and investigation *in vitro* and *in vivo* pharmacokinetics in rats. Method development, validation, stability, and pharmacokinetic sample of RK in plasma were analyzed by LC-MS/MS. RK was highly soluble in Tris buffer and stable in gastrointestinal fluids as well as in plasma. Rat liver microsomal (RLM) stability of RK in phase-I and phase-II was 84.96±2.39% and 69.98±8.69% after 60 min. Intestine permeability was 4.39±1.37x10^{-5}cm/s. Cmax was 1591.02±64.76 ng/mL achieved after 1h (tmax), and absolute oral bioavailability was 86.28%. Pharmacokinetic data serves as a keystone for preclinical and clinical adjuvant therapy. The results indicated RK was a high clearance, moderate half-life, and rapid volume of distribution to a tissue site in rats due to poor first-pass hepatic metabolism and high permeability, which affect the bioavailability. The outcomes reported in these experiments could provide a basis for RK selection and development as an orally choice active antihyperlipidemic agent and provide important leads for studying its metabolite for efficacy.

Simultaneous Estimation of Raloxifene & Cladrin using HPLC:

A reliable, sensitive, HPLC method was developed and validated to simultaneously quantify Raloxifene (RLX) and Cladrin (CLD). The C18 column was used to analyze RLX and CLD at λ_{max} 285 and 249 nm. The mobile phase was composed of ACN and 35:65% v/v aqueous solution of 0.1 % FA. Method was linear over the liniarity range of 0.078- 20 µg/ml, and the LOD and LOQ for RLX and CLD were 0.191, 0.228, 0.581 and 0.69 µg/ml respectively. In accordance with ICH guidelines, developed method is precise and accurate for simultaneous estimation of RLX and CLD with application in *in-vitro* liver microsomal stability in mice (MLM), rabbit (RbLM), dog (DLM), monkey (MKLM) and human (HLM). The method was specific in both blank and spiked plasma samples without the coelution of interference peaks. The developed method was further used to determined metabolic activity of different microsomal

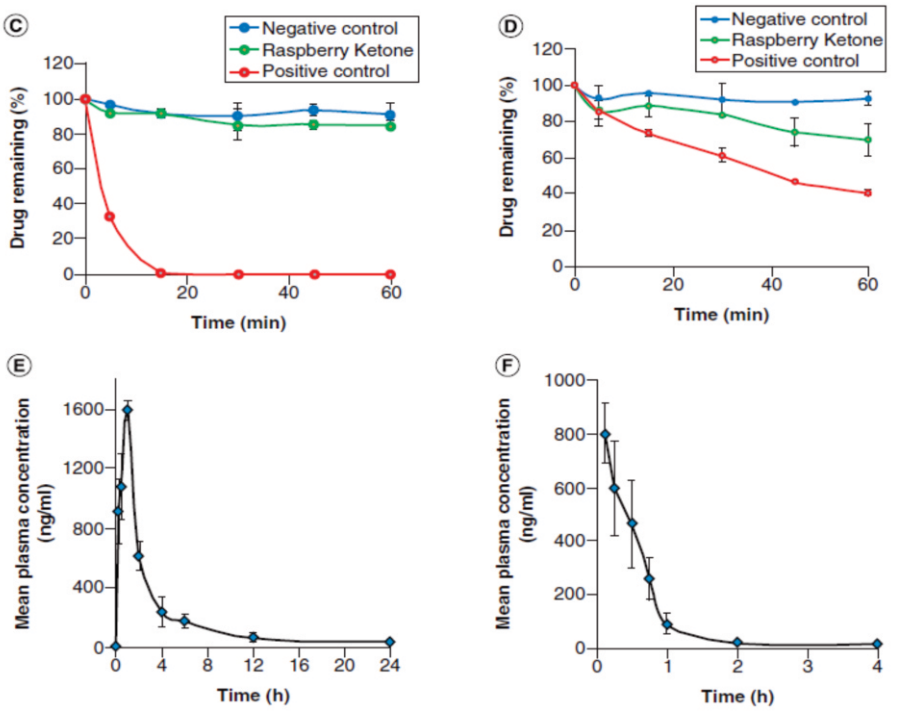

Figure: Stability profile of RK in (c) CYP450 mediated metabolic reaction represents NADPH deficient (negative control), Raspberry Ketone (test drug) and Testosterone (positive control) (d) UGT mediated metabolic reaction represents UDPGA deficient (negative control), Raspberry Ketone (test drug) and Estradiol (positive control). Plasma concentration vs time profile of RK after (e) 100 mg/kg oral and (f) 10 mg/kg intravenous administration.

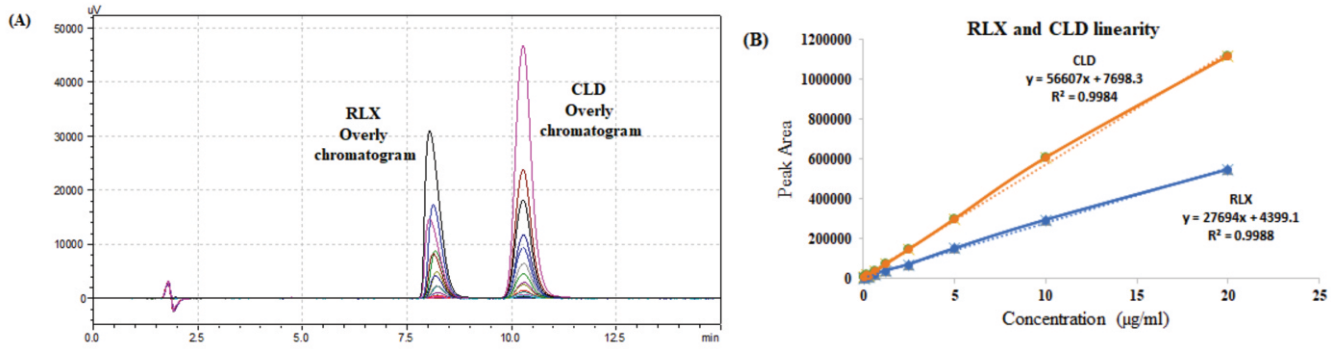

Figure: RLX and CLD linearity. (A) Chromatographic overlay of various injection concentrations; (B) Calibration curve.

stability at various point. The liver is the primary site of xenobiotic metabolism, with a diverse set of enzymes capable of phase I (oxidation, reduction, and hydrolysis) and phase II reaction (conjugation with endogenous substances).

Simultaneous Estimation of Quercetin and trans-Resveratrol in *Cissus quadrangularis* Extract

Cissus quadrangularis is a nutrient-rich plant with a history of use in traditional medicine. It boasts a diverse range of polyphenols, including quercetin, resveratrol, β-sitosterol, myricetin, and other compounds. We have developed and validated a sensitive LC-MS/MS method to quantify quercetin and *t*-res biomarkers in rat serum and applied this method to pharmacokinetic and stability studies. Mass spectrometer was set to negative ionization mode for the quantification of quercetin and *t*-res. Phenomenex Luna (C18(2), 100A, 75×4.6mm, 3µ) column was utilized to separate the analytes using an isocratic mobile phase consisting of methanol and 0.1% formic acid in water (82:18). Validation of the method was performed using various parameters, including linearity, specificity, accuracy, stability, intra-day, and inter-day precision, and matrix effect. There was no observed significant endogenous interference from the blank serum. The analysis was completed within 5.0 minutes for each run, and the lower limit of quantification was 5 ng/mL. The calibration curves showed a linear

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3rd, 4th & 5th Rows: Project Staff and Students

range with a high correlation coefficient (r2>0.99). The precision for intra- and inter- day assays showed relative standard deviations from 3.32% to 8.86% and 4.35% to 9.61%, respectively. The analytes in rat serum were stable during bench-top, freeze-thaw, and autosampler (-4° C) stability studies. After oral administration, the analytes showed rapid absorption but underwent metabolism in rat liver microsomes despite being stable in simulated gastric and intestinal fluids. Intragastric administration resulted in higher absorption of quercetin and *t*-res, with greater C_{max}, shorter half-life, and improved elimination. No prior research has been conducted on the oral pharmacokinetics and stability of anti-diabetic compounds in Ethanolic extract of *Cissus quadrangularis* EECQ, making this the first report. Our findings can provide the knowledge of EECQ's bioanalysis and pharmacokinetic properties which is useful for future clinical trials.

1.2 Safety Pharmacology Studies

The cardiovascular safety was assessed for NMITLI-118 AF1. Oral administration of NMITLI 118 AF1 at different doses of 50, 125, 250 and 500 mg/kg did not cause any change in the heart rate, blood pressure and cardiac profile, specifically the QT- QT-QT-interval prolongation in conscious Sprague Dawley rats compared to its respective vehicle-treated control.

1.3 Regulatory Toxicity Studies

Different regulatory toxicity studies of the following molecules have been conducted during the year. They are of different chemical natures and are meant for different diseases.

S-019-0277 (Lymphatic filariasis)

Acute toxicity studies were conducted by exposing the mice to three different doses treated orally and observing the animals in to the following fourteen days. The doses tested were 500, 1000 and 2000mg/kg. No adverse effects were observed in the tested doses, and the MTD was found to be beyond 2000mg/kg.

SB/CDRI4/105 (Peripheral neuropathic pain)

Acute toxicity studies were conducted in rats by exposing the animals in three different doses through Sub Cutaneous and observing the animals in the following fourteen days. The doses tested were 6.25, 12.5 and 25 mg/Kg. No adverse effects were observed in the tested doses. Therefore, the MTD is beyond 12.5mg/Kg.

Chebulinic Acid Enriched Fraction (CAEF) (Benign prostate hyperplasia {BPH})

Acute toxicity studies were conducted in mice by exposing the animals orally with three different doses i.e. 1000, 1500 and 2000mg/Kg and observing the animals in the following fourteen days. No adverse effects were observed in the tested doses. Therefore, it is concluded that the MTD is beyond 2000mg/Kg.

Male fertility of chebulinic acid enriched fraction (CAEF) was conducted in SD Rats by the oral route. Three doses were tested. The doses were 1000, 1500 & 2000mg. All the doses were found to be safe without interfering with the fertility of males.

2-Amino-5-hydroxy hexanoic acid/ (5-hydroxy norleucine) (Diabetic nephropathy)

Acute toxicity studies were conducted in mice by exposing the animals in three different doses and observing the animals in the following fourteen days. No adverse effects were observed in the tested doses.

S017-622 (PCSK9 inhibitor)

7-day dose finding study: S017-622 was studied for repeat exposure daily. Both were administered orally. S017-622 was studied for seven days to find out the doses for long-term studies and was found to be toxic even at 500mg/Kg lowest dose and was dropped from the development pipeline of CDRI.

S016-1348 (Anti cancer)

28-day repeat dose toxicity study. S016-1348 was tested for 28 days at the doses of 37.5, 75, and 150 mg/kg and all doses were found to be safe.

S011-1793 (Anti malarial)

In vitro chromosomal aberration test. *In vitro* chromosomal aberration test was conducted using human peripheral blood lymphocytes to determine the mutagenic and clastogenic potential of S011-1793. Three concentrations i.e. 25, 50, and 100 µM concentrations, were checked, and it was found that the molecule is non mutagenic and not clastogenic.

Studies on the Role of Pirh2 in Modulation of Mitochondrial Function and Cytochrome c-Mediated Neuronal Death during Alzheimer's Disease

The Role of Pirh2 in modulation of mitochondrial function and cytochrome c-mediated neuronal death in Alzheimer's disease was studied extensively. Pirh2 is an E3 ubiquitin ligase known to regulate the DNA damage responses through ubiquitylation of various participating signaling factors. DNA damage is a key pathological contributor to Alzheimer's disease (AD), therefore, the role of Pirh2 was investigated in streptozotocin and oligomer $A\beta_{1-42}$ induced rodent experimental model of AD. Pirh2 protein abundance increased during AD conditions, and transient silencing of Pirh2 inhibited the disease-specific pathological markers like level of p-Tau, βamyloid, acetylcholinesterase activity, and neuronal death. Biochemically, Pirh2 silencing significantly attenuated the oxidative

stress, depleted mitochondrial membrane potential, cytochrome c translocation from mitochondria to cytosol, and depleted mitochondrial complex-I activity, and ATP level. Pirh2 silencing also inhibited the altered level of VDAC1, hsp75, hexokinase1, t-Bid, caspase-9, and altered level of apoptotic proteins (Bcl-2, Bax). MALDI-TOF/TOF, co-immunoprecipitation, and UbcH13-linked ubiquitylation assay confirmed the interaction of Pirh2 with cytochrome c and the role of Pirh2 in ubiquitylation of cytochrome c, along with Pirh2-dependent altered proteasome activity. Additionally, Pirh2 silencing further inhibited the translocation of mitochondrion-specific endonuclease G and apoptosis-inducing factors to the nucleus and DNA damage. In conclusion, findings suggested the significant implication of Pirh2 in disease pathogenesis, particularly through impaired mitochondrial function, including biochemical alterations, translocation of cytochrome c, endonuclease G and apoptosis-inducing factor, DNA damage, and neuronal apoptosis.

Searching for Chemical Entities for the Amelioration of Liver Toxicity

The liver is the vital organ of the body, and is the prime target of anti-tuberculosis drugs; therefore, a rodent model is developed to evaluate different chemical entities to check their ameliorative activities. We have identified a few molecules that improve damaged liver health following the administration of anti-tuberculosis drugs.

1.4 Clinical Trials & Clinical Research:

1.4.1 Clinical Trials

The Standardized Fraction of *Picrorhiza kurroa* for the Treatment of NAFLD

The phase 3 clinical trial is ongoing at six prestigious medical institutions with support from ICMR, namely King George Medical University, Lucknow, AIIMS Delhi, PGIMER Chandigarh, KEM Mumbai, NIMS Hyderabad and ILBS, New Delhi, having state-of-the-art infrastructure with excellent tertiary-level medical facilities. A total of 132 volunteers were screened, and 65 have been enrolled and are taking Picroliv. The product has been licensed to Themis Medicare Ltd., Mumbai.

S007-1500 (Bone Fracture Healing Agent)

The investigational new drug S007-1500 has shown excellent activity in animal bone fracture models. All preclinical toxicity studies have been completed. The DCGI approval for the phase 1 clinical trial in healthy volunteers has been received. The product is licensed to Troika Pharmaceuticals, Ahmedabad. Troika pharmaceuticals Pvt. Ltd. has prepared GMP tablets of S007-1500 (10mg, 50 mg) for phase-I clinical trial.

S007-867 (Anti-Thrombotic Agent)

The permission for the phase 1 clinical trial has been received from DCGI. Marc Laboratories Ltd is processing the manufacturing of tablets. The phase 1 clinical trial in healthy

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volunteers has been planned at KEM Mumbai.

Centinhale (Inhalation Agent for Pulmonary Tuberculosis)

Centinhale has shown excellent efficacy in inhalation studies in guinea pigs and other animal models. Safety has been established. The investigational new drug application for the phase 1 clinical trial is ongoing. Cadila Pharmaceuticals have agreed to manufacture the clinical trial batches under CGMP.

Chebulinic Acid Enriched Fraction (CAEF) for Benign Prostatic Hyperplasia (BPH)

The drug has shown excellent preclinical efficacy in the animal models of BPH. All the regulatory toxicity studies have been completed. The investigational new drug application is being compiled.

NMITLI118R (T+) (Anti Stroke Agent)

The preclinical data is under compilation for the IND application. The stability studies are on going. The IND document will be completed after stability testing.

1.4.2 Clinical Research Studies

Role of Asymmetric Dimethylarginine in Endothelial Dysfunction: Insights into Cardiovascular Risk Factors

The study comprised 136 participants, with 91 (66.9%) males and 45 (33.1%) females. Among these, 30 were healthy controls, and 106 were patients with T2DM, including those with diabetic complications (DCAD and DKD) and those without (DM group). Comparisons with healthy controls revealed significant differences in ADMA levels ($P < 0.001$), with the highest in the DCAD group (339.3 ± 204.5 ng/ml) and the lowest in controls (89.6 ± 83.3 ng/ml). Endothelial dysfunction emerges as a critical factor, emphasizing the importance of monitoring ADMA levels, which can independently predict worse cardiovascular outcomes.

Triglyceride glucose (TyG) Index as a Novel Biomarker in Patients with Type 2 Diabetes Mellitus (T2DM) Developing Acute Coronary Syndrome (ACS)

This was a cross-sectional, case-control study conducted over 1 year with a sample size of 175 T2DM subjects divided into cases and controls at a ratio of 2:5 at KGMU Lucknow. The TyG index showed a strong correlation with ACS, and linear regression analysis identified it as the strongest risk factor for ACS in these patients, with a cutoff value of 8.9, providing 99% sensitivity and specificity.

Cystatin C and Performance of Cystatin C-based Equations for Calculating GFR in the Management of Chronic Kidney Disease Patients

The study was performed on 109 Chronic Kidney Disease (CKD) patients. Serum creatinine and cystatin C levels were measured in the same patients. Glomerular Filtration Rate (GFR) was estimated using 5 equations (Larsson, Hoek, Lebricon, Filler, CKD-EPI Cystatin c) that are based on serum cystatin c, and three equations (Cockcroft-Gault, MDRD and CKD-EPI Creatinine) based on serum creatinine. Cystatin C is a potential marker of kidney function in patients of chronic kidney disease. The equations containing both serum creatinine and serum Cystatin C are more accurate than other equations for estimating GFR.

2 Microbial Infections

Vision :

To decipher the biology of microbial infections and undertake the discovery and development of novel therapeutics against drug-resistant microbial pathogens

Goals :

- Development of new drugs/drug combinations and delivery systems as therapeutic interventions for infections caused by mycobacterial, fungal and ESKAPE pathogens
- Investigation of disease biology and host-pathogen interactions
- Identification of unique targets and pathways in pathogens for designing future interventions
- Development of recombinant bacterial strains and new animal models for exploring disease pathogenesis and PK/PD studies Studying disease epidemiology and susceptibility of Indian populations to severe disease manifestation

First Row (L to R): Dr. Madhav Nilakanth Mugale, Dr. Niti Kumar, Dr. Sudheer Kumar Singh, Dr. Mohammad Imran Siddiqi, Dr. Sanjay Batra, Dr. Radha Rangarajan, Dr. Arunava Dasgupta, Dr. Mukesh Pasupuleti, Dr. Y. K. Manju, Dr. Vineeta Rai

Second Row (L to R): Dr. Arun Kumar Haldar, Dr. Namrata Rastogi, Dr. Malleswara Rao Kuram, Dr. Pintu Kumar Mandal, Dr. Sidharth Chopra, Dr. Kishor Mohanan, Dr. Ravindra Kumar, Dr. Jiaur Rahaman Gayen, Dr. Rajdeep Guha, Dr. Rabi Sankar Bhatta, Dr. Damodara Reddy N., Dr. Gorakhnath Rajaram Jachak

2.1 Progress in Biological Screening

2.1.1 Assay Summary of Compounds Screened Against *Mycobacterium tuberculosis*

Compounds Received	Activity (µM)					
	> 50	50	25	12.5	6.25	3.12
52	43	08	0	0	0	01

2.1.2 Biological Screening Summary for ESKAPE pathogens

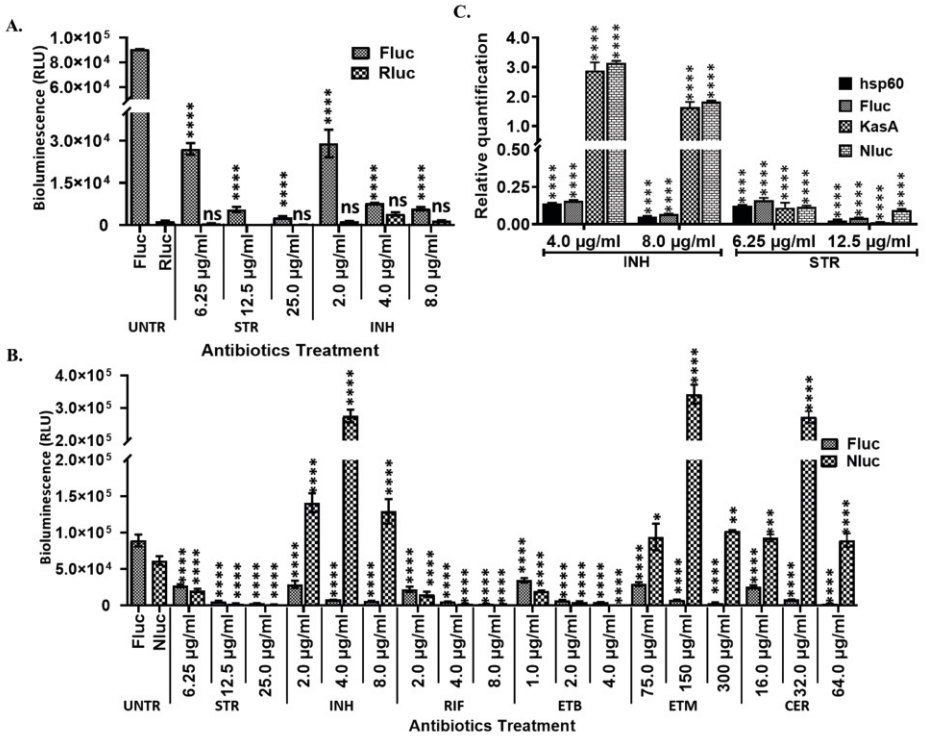
A total of 263 compounds were screened in whole cell antibacterial activity against ESKAPE pathogens. 64 identified active against *S. aureus* and are being further optimized for improved efficacy.

2.2 Progress in Fundamental Research

2.2.1 Rapid Screening of Primary and Rationally Synthesized Anti-mycobacterial Compounds in Macrophage using Double Recombinant *M. bovis* BCG Strain

Antimycobacterial screening is done primarily at three levels; *in vitro, ex vivo* and *in vivo*. In earlier studies, we had generated a double recombinant *Mycobacterium bovis* BCG strain carrying firefly and Renilla luciferase genes as two reporters under the control of a constitutive and an inducible mycobacterial promoter. The presence of dual reporters allows simultaneous expression and analysis of two reporter enzymes within a single system. The expression profile of the firefly luciferase gene, rendered by a constitutive mycobacterial promoter, corroborates with the decline in bacterial growth in response to a wide range of antimycobacterial drugs, while the enhanced expression of Renilla luciferase mirrors the selective induction of the reporter gene expression as a result of FAS-II pathway-specific inhibition. Thus, the double recombinant strain allows the screening of both primary and rationally synthesized FAS-II pathway inhibitors in a single assay. While this was successfully used for *in vitro* screening, *ex vivo* adaptation of this screen-system posed several challenges. The constitutive hsp60pr showed appreciable expression inside macrophages, but the expression of the inducible *kas* operon promoter was found to be meager. This became a limiting factor as more number of bacilli needed per screening sample and with continued treatment the decline in CFU level worsens the detection limit of the luciferase assay. To develop a screen-system that compensate the lower level expression of a given mycobacterial promoter inside macrophages we introduced Nano luciferase reporter in recombinant mycobacteria. Nano luciferase emits several-fold brighter luminescence than firefly and Renilla luciferases and duly compensates the lower level expression of the *kas* operon promoter inside macrophages. The newly engineered double recombinant strain stays stable inside macrophages and serves as a model screen-system for general and pathway specific anti-mycobacterial *ex vivo* screening. The turnaround time is significantly reduced and the outcomes are similar and more consistent with those attained using conventional CFU based procedures. **[Journal of Microbiological Methods 230–231 (2025) 107105].**

- Dr. BN Singh
Chief Scientist &
Area Coordinator

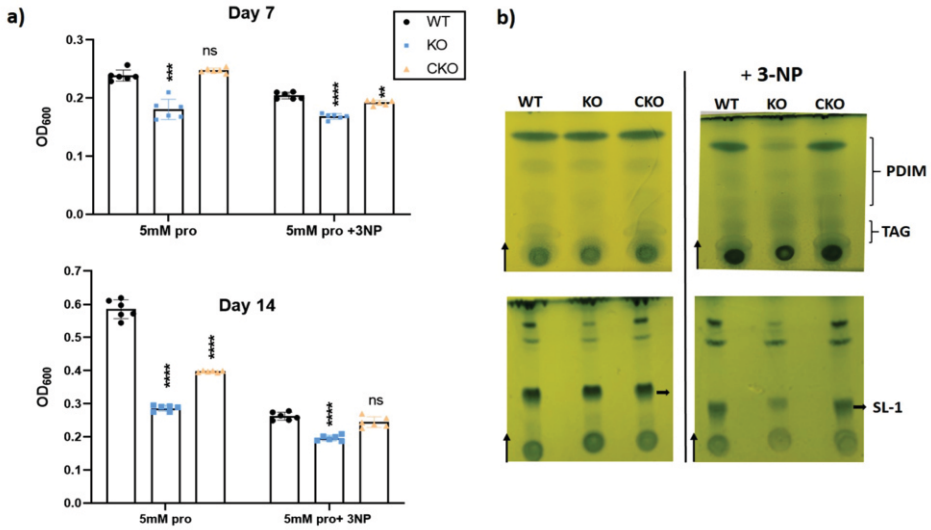


The dual-luciferase assay was performed using double recombinant *M. bovis* BCG strain, *M.* bovis BCG:hsp60pr-Fluc:43pr-Rluc (A), *M. bovis* BCG:hsp60pr-Fluc:43pr-Nluc (B). Infected macrophages samples were lysed after 24hr treatment, Fluc-Rluc and Fluc-Nluc activities were assayed together and the bioluminescence was recorded in RLU. (C) qRT-PCR analysis was performed using RNA samples from the recombinant *M. bovis* BCG strains inside macrophages after treatment with antibiotics. The expressions of hsp60 and Fluc, kasA and Nluc were derived from native and ectopic hsp60 and kasA promoters, respectively. Note a similar decline in the expression of hsp60 and Fluc in INH and streptomycin treated samples while an enhanced expression of kasA and Nluc is noticed only in INH treated samples and not in the streptomycin treated samples. The expression levels were normalized with *sigA*. The values represent the mean and the standard deviations from independent sets of experiments.

- Dr. Sidharth Chopra
Senior Principal Scientist &
Area Coordinator

2.2.2 Role of a Triacylglycerol Synthase of *Mycobacterium tuberculosis* in Redox Homeostasis and Propionate Detoxification

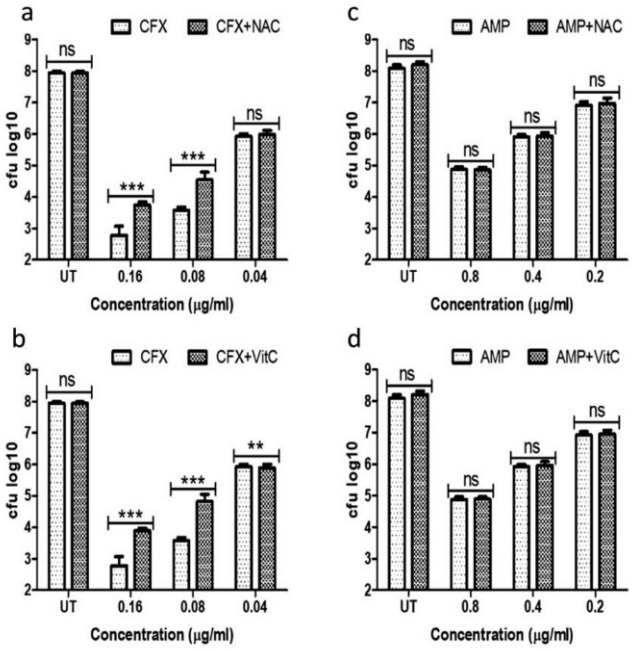
Triacylglycerol (TAG) is the major storage lipid of mycobacteria. *Mycobacterium tuberculosis* (Mtb) genome encodes 15 triacyl glycerol synthases (Tgs), which are speculated to differ in substrate preference, suggesting specific physiological roles. In this study, we investigated the role of a Tgs, Rv3371, in the context of infection. Rv3371 knock-out (KO) Mtb was attenuated in mice, with corresponding poor fitness inside macrophages. The KO was more sensitive to free long-chain fatty acids, but was more tolerant to oxidative and nitrosative stresses. Enzyme kinetics of Rv3371 showed its preference for propionyl-CoA. Excess propionate in growth medium retarded the growth of the KO more significantly than the wild type and complemented mutant. This suggests an additional role of Rv3371 in reducing toxic levels of propionate in Mtb by synthesising propionyl TAG. Moreover, chemical inhibition of methyl citrate cycle by 3-nitropropionate (3-NP) caused a decrease in methyl-branched lipids in the KO. Overall, the results suggest a role of Rv3371 in Mtb survival in the host through its roles beyond TAG storage. **[Tuberculosis (Edinb.) 2025, 152, 102617 PMID: 40020280]**



Excess propionate in presence of other carbon substrates lowers the growth and methyl-branched lipid levels of Rv3371 knock-out

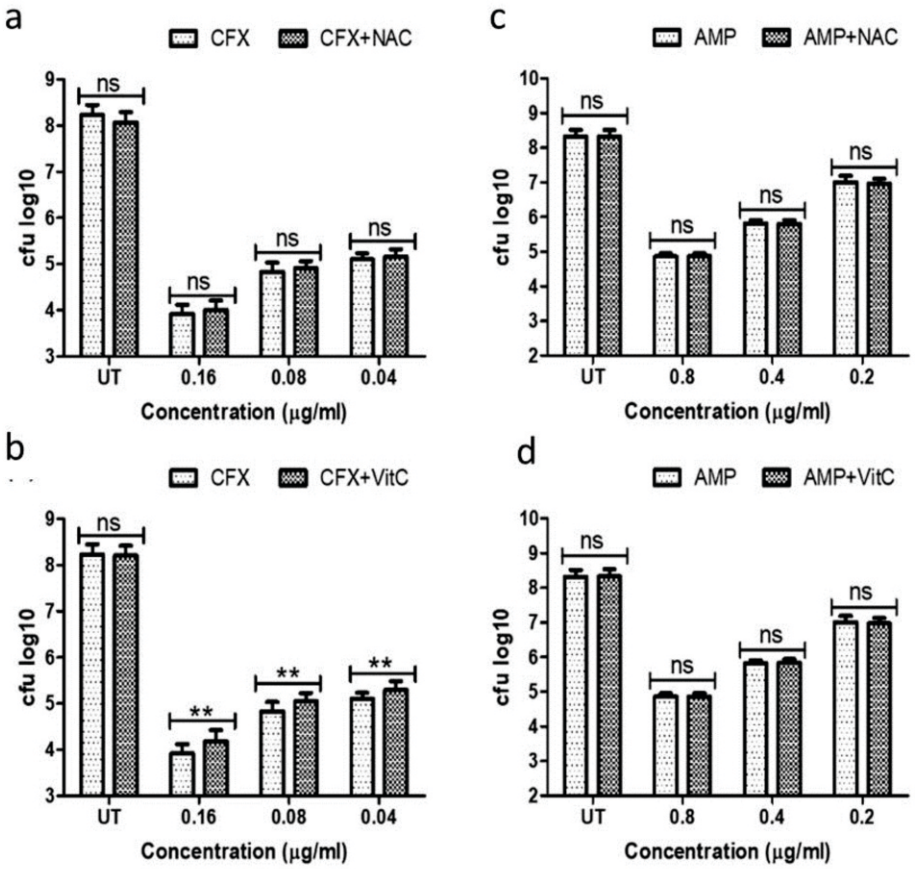
2.2.3 N-Acetyl Cysteine (NAC) and Vitamin C (VitC) as Antioxidant and its Role in Antibiotics Efficacy

N-acetyl cysteine (NAC) and Vitamin C (VitC), both have antioxidant properties. VitC has an important role to play being a cofactor for many important enzymes, while NAC is used as a mucolytic agent and in acetaminophen overdose. NAC being a mucolytic agent is used in lung conditions such as COPD and chronic bronchitis and may also be prescribed along with antibiotics. Given that both VitC and NAC



Survival of *E. coli* nutrient starved cells in presence of antibiotics alone and in combination with NAC and Vit-C. a and c represent treatments with CFX and AMP, respectively, alone and in combination with NAC. b and d represent treatments with CFX and AMP, respectively, alone and in combination with Vit-C. CFX, AMP, NAC and Vit-C refer to ciprofloxacin, ampicillin, N-acetyl cysteine and Vitamin C, respectively. Significance analysis was done by Student's *t*-test, ns= not significant, $^{**}p< 0.01$, $^{***}p< 0.001$.

- Dr. Gautam Panda
Chief Scientist &
Area Coordinator



Survival of *E. coli* stationary-phase cells in presence of antibiotics alone and in combination with NAC and Vit-C. a and c represent treatments with CFX and AMP, respectively, alone and in combination with NAC. b and d represent treatments with CFX and AMP respectively, alone and in combination with Vit-C. CFX, AMP, NAC and Vit-C refer to ciprofloxacin, kanamycin, ampicillin, N-acetyl cysteine and Vitamin C, respectively. Significance analysis was done by Student's *t*-test, ns= not significant, $^{**}p < 0.01$.

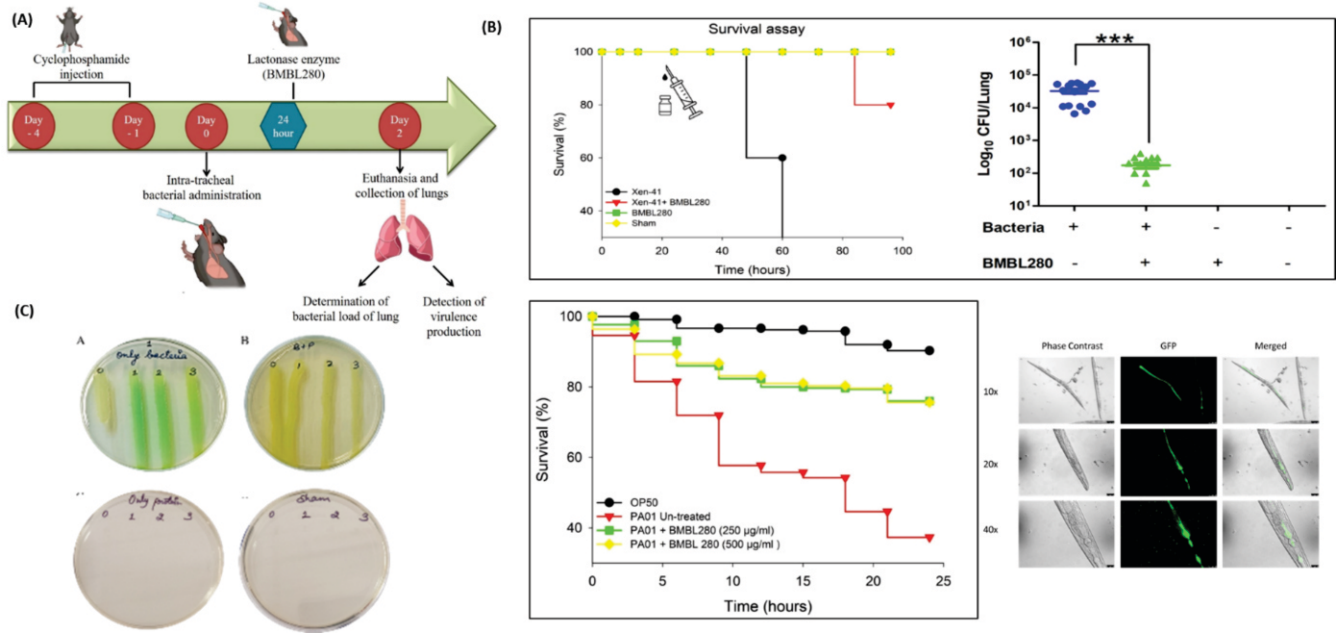
have antioxidant properties, present study was undertaken to assess if the antioxidant property was affecting the antibiotic efficacy. For this *Escherichia coli* cells, from different physiological states, including stationary-phase and nutrient starved persister cells, were used for evaluation. The survival of *E. coli* cells was measured in cfu/mL colony-forming unit counts, and CFUs in antibiotics alone treatments were compared with antibiotic + antioxidant treatments. The findings suggest that presence of NAC and VitC reduced ciprofloxacin activity (increased CFUs) against persister cells. While treatment of stationary-phase cells showed no effect of NAC on killing but in the presence of VitC some reduction in activity was observed. Treatment with beta-lactam antibiotic Ampicillin was not influenced by presence of either NAC or VitC, against nutrient starved persister cells or stationary phase cells. The findings suggest that the overall impact of antioxidants on antibiotic efficacy varies depending on the antibiotic class and physiological state of cells (**Microbial Drug Resistance, 2025, 31 (3), 87-93**).

2.2.4 Development of Novel Quorum Quenching Activity from the Marine Bacteria

As multidrug resistance strains are increasing at an alarming rate therapeutic options are getting increasingly limited for treating the ESKAPE pathogen associated infectious diseases. Bacterial evolution rate has left behind the drug development pace. For the development of new anti-infective agents, we need novel, radical and un-conventional combinatorial approaches. The new anti-infective agents should be far away from demerits of classical anti-microbial agents as cidal or static drugs can be easily defeated by bacterial resiliency. Pathogens use quorum sensing (QS) process to control antibiotic resistance, virulence factor production, biofilm formation, survival and defence from the host immune system, stress resistance, social behaviour, protease, siderophore production, cell-to-cell and interspecies communication, inhibits the antibiotic and virulence factor, biofilm formation. Despite the differences in components and mechanisms, all known QS systems fundamentally follow three basic principles i.e. synthesis of signal molecules,

detection of the signal by receptors after attaining local high concentration and upregulated expression of genes necessary for survival or pathogenesis. In order to control and modulate the microbial community, nature has evolved different tools to interfere with QS. There are a number of ways to inhibit QS signaling pathways, anti-QS molecules to target the receptor protein or regulator protein, or degrade the QS molecule (e.g. Acyl homoserine lactone AHL) itself. Among the entire three targets, success has been seen with competitive inhibition or degradation of the signalling molecule.Recently, QQ have emerged as apotential alternative to antibiotic use either in alone or combination with other molecules. N-Acyl homoserine lactones (AHLs) is the QS signal molecules in Gram-negative bacteria and degradation of them by enzyme e.g lactonase or acylase is called as Quroum quenching (QQ). Some researchers, including us, believe that inhibiting Quorum sensing (QS) by anti-QS agents could provide a novel method of combating infection as targeting QS does not affect the fitness of population and avoid the selection pressure as compare to the classical antibiotic discovery approach. However, it is not clear whether degradation of QS signal molecules reduced pathogenicity in ESKAPE pathogens. Hence we are interested in exploring enzyme which has a potential to cleave the extracellular signal molecules as bio therapeutics to address the antimicrobial resistance in priority pathogens.

Our preliminary studies have demonstrated marine bacteria *Bacillus oceanisediminis* extracellular enzyme has the ability to degrade wide range of N-Acyl homoserine lactones molecules under physiological conditions. With the help of acidification assay and LC-MS study we have determined that *B. oceanisediminis* extracellular enzyme belongs to lactonase family enzyme. Further, *B. oceanisediminis* derived lactonase (BAL) quantitatively reduced production of virulence factors in the clinical isolates of *Pseudomonas aeruginosa*. Additionally, targeting the *Pseudomonas aeruginosa* quorum sensing phenomenon by the BAL enzyme inhibits the biofilm formation, antibiotic and stress resistance, virulence factor production, social behaviour, survival and defense from the host immune system. In *P. aeruginosa* PA01 infection model, at single dose treatment of BAL at 500 µg/ml an increase (80%) in the survival of *C. elegans* was observed. In conclusion, the study, in addition to other demonstrates that BAL has a potential to be developed as biotherapeutics.



In vivo anti-virulence activity of BMBL280. [A] Experiment set [B] The image shows the survival graph of mice infected with *Pseudomonas aeruginosa* and BMBL280 treatment group (middle). The graph shows the CFU count per lung of the mice. [C] The inlet figure show reduction of virulence factors produced by *P. aeruginosa* upon treatment with the lactonase enzyme. [D] Virulence assay in *C. elegans* . Percent survival of *C. elegans* when grown on a lawn of GFP-tagged *P. aeruginosa* and treatment with protein. Fluorescent image showing the feeding of *P. aeruginosa* bacteria by *C. elegans*.

3 Parasitic Infections

Vision :

Discover new bioactives against Malaria, Leishmania and Filaria parasites and unfold new molecular and biochemical mechanisms related to diseases caused by them

Goals :

- Discovery and development of new drugs/drug combinations and delivery systems as therapeutic interventions for parasitic diseases-malaria, leishmaniasis and filariasis
- Investigation of disease biology, host-pathogen interactions and immune evasion
- Identification of unique targets and pathways in pathogens for designing future interventions
- Development of new animal models for exploring disease pathogenesis and PK/PD studies
- Design and development of vaccine strategies for malaria and leishmaniasis

Front Row (L to R): Dr. Namrata Rastogi, Dr. Bidyut Purkait, Dr. Niti Kumar, Dr. Saman Habib, Dr. Sanjay Batra, Dr. Mohammad Imran Siddiqi, Dr. Arun Kumar Haldar, Dr. J. Venkatesh Pratap, Dr. Amogh Anant Sahasrabuddhe, Dr. K. V. Sashidhara

Second Row (L to R): Dr. Satish Mishra, Dr. Kalyan Mitra, Dr. Mrigank Srivastava, Dr. Prem Prakash, Dr. Mohammad Zeeshan, Dr. Kishor Mohanan, Dr. Prem Prakash Yadav, Dr. Pintu Kumar Mandal, Dr. Suresh Kumar Kalangi

Exploring Biological Processes for Designing New Strategies of Intervention in Parasitic Diseases and Anti-parasitic Drug Discovery

3.1 Malaria

3.1.1 A *Plasmodium falciparum* Apicoplast-Targeted Exo/FEN has a Functional LCR that Expands its Substrate Repertoire

The human malaria parasite *P. falciparum* genome is highly A+T rich (~82%), with low complexity regions (LCRs) inserted in coding sequences. Replication of the circular genome (plDNA) of its relict plastid, the apicoplast, is mediated by the atypical multifunctional DNA polymerase *Pf*Prex which would require additional enzymatic functions for lagging strand processing. We identified an apicoplast-targeted, [4Fe-4S]-containing, FEN/Exo (*Pf*Exo) with a long (>150 amino acids) LCR insertion, which interacted with *Pf*Prex. Distinct from other known exonucleases across organisms, *Pf*Exo recognized a wide substrate range; it hydrolysed 5'-flaps, processed dsDNA as a 5'-3' exonuclease, and was a bipolar exonuclease on ssDNA and RNA-DNA hybrids. Comparison with its ortholog in the rodent malaria parasite *P. berghei* revealed that *Pb*Exo, which lacked the insertion and [4Fe-4S], had functional differences with *Pf*Exo as it had a comparatively restricted substrate range. The insertion (LCR)-deleted *Pf*ExoΔins behaved like *Pb*Exo with a limited substrate repertoire because of compromised DNA binding. Introduction of the *Pf*Exo LCR into *Pb*Exo led to gain of activities that the latter had initially

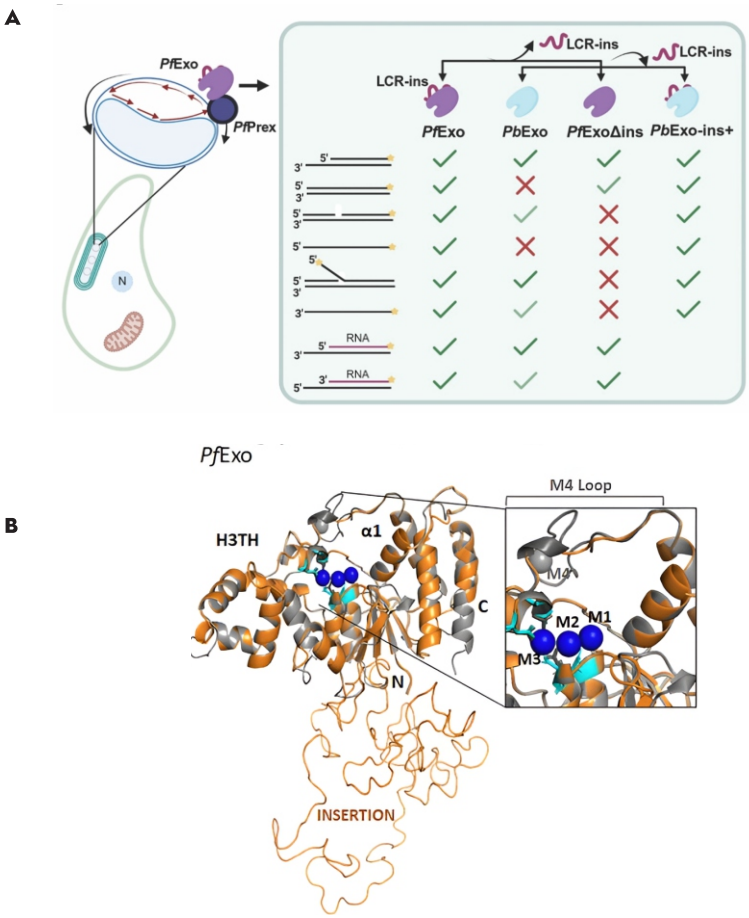


Figure 1. (A) Diversity of substrates recognized by *Pf*Exo and its LCR-deletion and insertion constructs. (B) *Pf*Exo (orange) modelled on the crystal structure of *Mycobacterium smegmatis* FenA (grey). The LCR insertion appears as a large disordered region. M1-3 are metal binding sites in the catalytic pocket.

- Dr. Sanjay Batra
Chief Scientist &
Area Coordinator

lacked. Our results demonstrated the presence of a novel apicoplast exonuclease with a functional LCR that diversified substrate recognition. *Pf*Exo was thus the candidate flap-endonuclease and RNaseH required for plDNA replication and maintenance (Figure 1) (***Nucleic Acids Research*, 2024, PMID: 38888125**).

3.1.2 Transport of [Fe-S] Clusters/ Intermediates from the Mitochondrion to the Cytosol is Mediated by *Pf*ATM1

Fe-S clusters generated in mitochondria are required to be transported to the cytosol for maintaining functionality of recipient proteins. The malaria parasite has a functional mitochondrial ISC pathway for assembly of [4Fe-4S]. We identified the *P. falciparum* ATM1 homolog (annotated as MDR6) as a putative upstream transporter of these clusters to the cytosolic CIA machinery. Antibodies generated against the unique N-terminal extension (NTE) of *Pf*ATM1 localised the protein to the mitochondrion (Figure 2). Recombinant *Pf*ATM1 dimer bound [4Fe-4S] as well as oxidised glutathione and exhibited maximal ATPase activity upon addition of GSSG to holo- as opposed to apo-*Pf*ATM1. Molecular structure modelling supported the view that *Pf*ATM1 could bind GSSG and accommodate a [4Fe-4S]GS4 complex in its inner cavity. Cargo transport by *Pf*ATM1-liposomes was enhanced upon ATP hydrolysis. *Pf*ATM1 interacted with the mitochondrial ISC pathway scaffold/transfer proteins *Pf*IscU and *Pf*IscA2 and could receive [4Fe-4S] from both donor proteins in transfer reactions *in vitro*. It also interacted with CIA pathway scaffold protein *Pf*Nbp35 indicating that it can make contact with primary CIA components. Vivo-morpholino mediated ablation of *Pf*ATM1 slowed down parasite growth in blood stages demonstrating its significant physiological role. Collaboration with Prof. Dominique Soldati and Dr. Joachim Kloehn, University of Geneva established the essentiality of ATM1 in the related apicomplexan *Toxoplasma gondii* and complementation of the *Tg*ATM1 KO line with *Pf*ATM1, indicating functional complementarity (***PLoS Pathogens*, 2024, PMID: 39348385**).

3.1.3 Developing Novel Strategies to

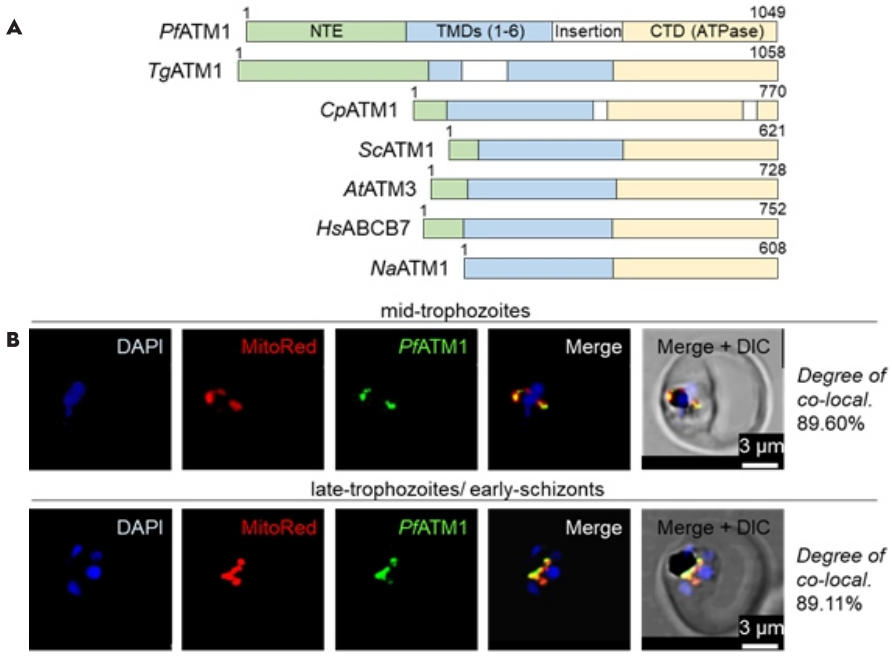


Figure 2. (A) Domain organization and N-terminal extensions (NTE) in ATM1 homologs from apicomplexan parasites (*P. falciparum, T. gondii, C. parvum*), *Saccharomyces cerevisiae, Arabidopsis thaliana, Homo sapiens* and the bacterium *Novosphingobium aromaticivorans*. (B) Mitochondrial localization of *Pf*ATM1 at different intra-erythrocytic stages as detected in IFAs.

- Dr. Saman Habib
Chief Scientist &
Area Coordinator

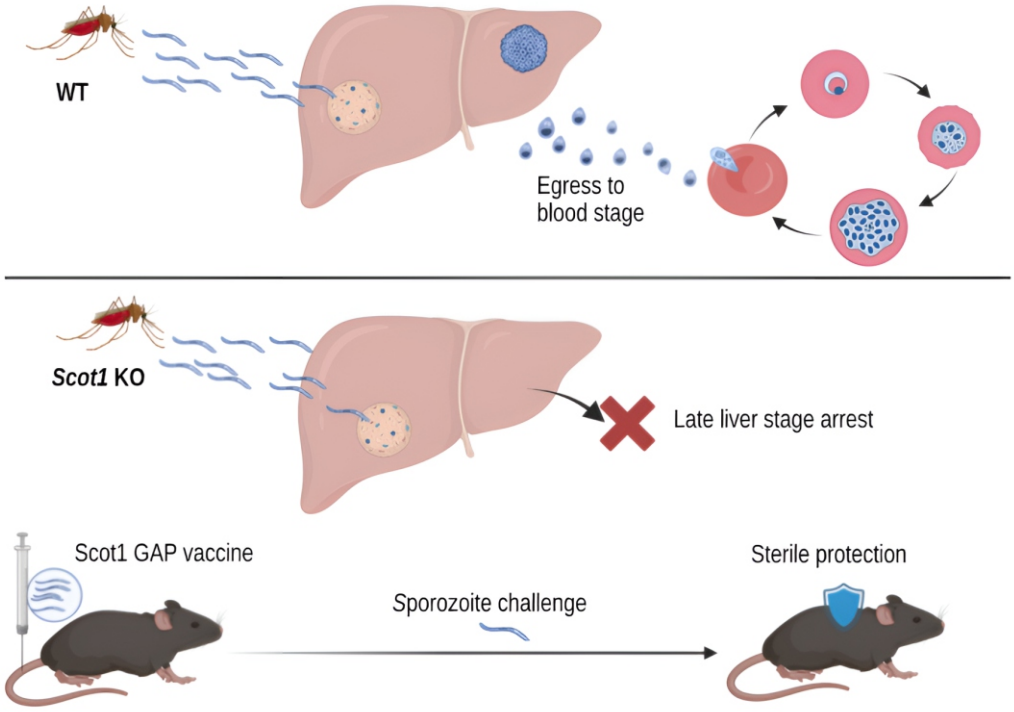


Figure 3. Vaccination with *Scot1* KO sporozoites protects against malaria challenge.

Target Malaria Parasites

Liver-stage genetically attenuated malaria parasites (GAPs) are powerful immunogens that provide protection against sporozoite challenge. Using targeted gene deletion in *Plasmodium berghei*, we showed that Scot1 is essential for late liver-stage development. Immunization with Scot1 KO sporozoites in C57BL/6 mice confers protection against malaria via infection (Figure 3). In a safety study, we observed rare breakthrough blood-stage infections in mice inoculated with high doses of Scot1 KO sporozoites (PMID: 39037752). To develop a safe vaccine candidate, we generated a Scd/Scot1 GAP by dual gene deletion (PMID: 39424860). Compared with early-arresting GAP (EA-GAP), late-stage liver-arresting Scd/Scot1 KO (LA-GAP) induces greater and broader CD8+ T-cell responses and elicits stage-transcending immunity that provides superior protection in C57BL/6 mice (Figure 4).

Motility and invasion of Plasmodium sporozoites are

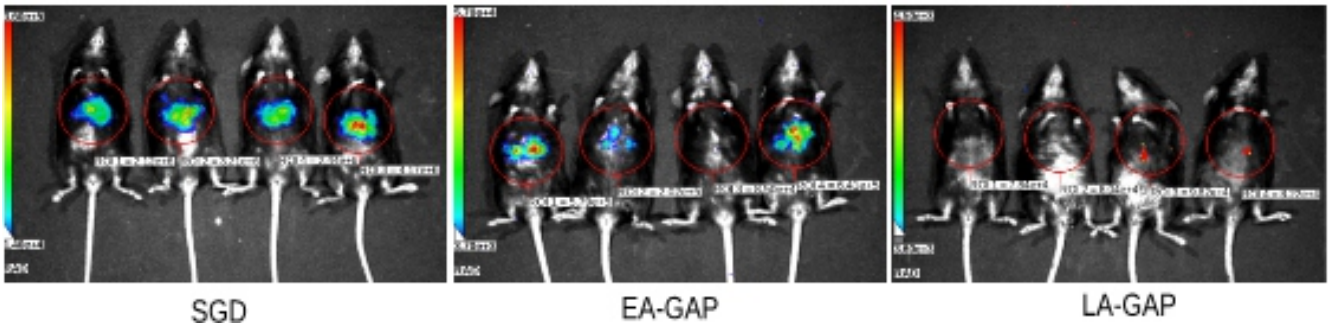


Figure 4. Compared with EA-GAP vaccination, LA-GAP vaccination provides superior protection.

powered by an actin-myosin motor complex linked to the glideosome, which contains glideosome-associated proteins (GAPs), MyoA and the myosin A tail-interacting protein (MTIP). C-terminal 3×HA-mCherry tagging revealed that S14 is expressed and localized on the inner membrane complex of the sporozoites. We disrupted S14 in *P. berghei* and demonstrated that it is essential for sporozoite gliding motility, and salivary gland and hepatocyte invasion (Figure 5; **J. Cell Sci. PMID: 38832798**).

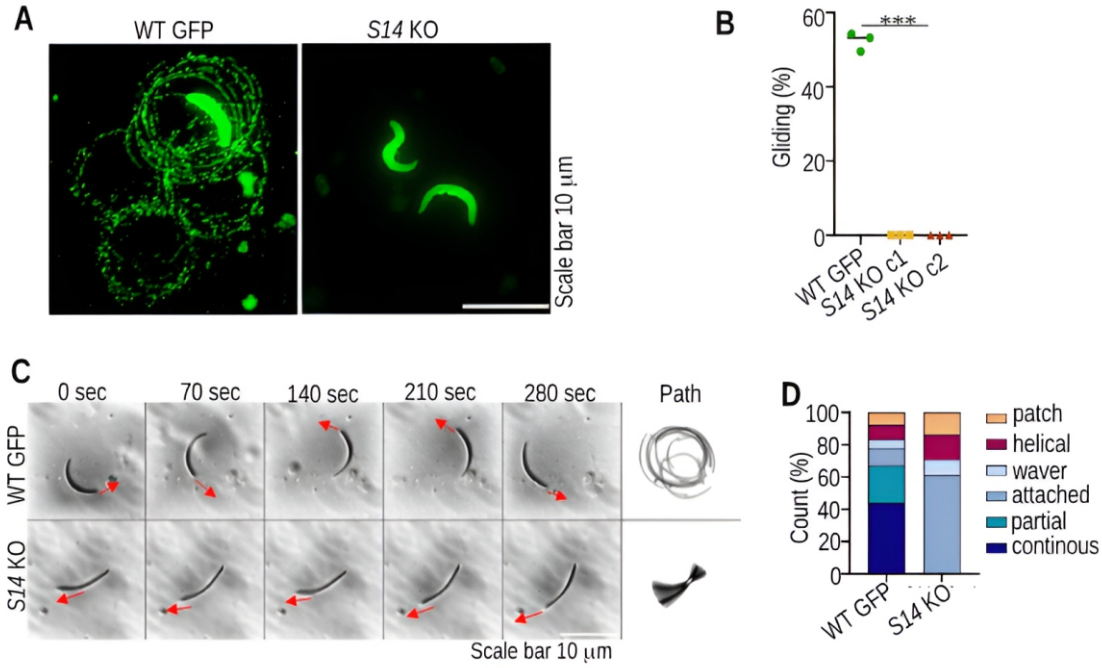


Figure 5. S14 is essential for sporozoite gliding motility.

Following hepatocyte invasion, the *Plasmodium* sporozoites discard superfluous organelles for intracellular replication, and the remnant organelles undergo extensive branching and mature into hepatic merozoites (Figure 6; **PMID: 39714137).**

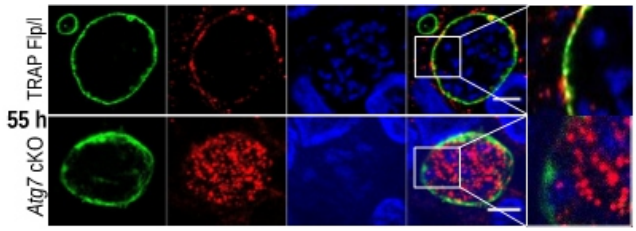


Figure 6. Atg7 cKO parasites failed to exocytose micronemes during liver stage development.

3.1.4 Understanding the Role of RING-between-RING E3 Ligase of the Human Malaria Parasite

Plasmodium E3 ligases are not well explored. E3 ligases can be classified as RING, HECT and RING-between-RING (RBR) E3 ligase. Out of these, malaria parasite harbors only a single RBR-E3 ligase which has significantly diverged from its human ortholog. This RBR-E3 ligase is expressed throughout the erythrocytic phase of the *P. falciparum* lifecycle. Immunoprecipitation experiments showed that *Pf*RBR-E3 ligase catalyzes K6, K11, K48, and K63 mediated polyubiquitination, hinting towards its probable biological roles (DNA repair, proteasomal degradation, mitochondrial quality control). We observed that *Pf*RBR-E3 ligase interacts with UBCH5 and UBC13 family of E2-conjugating enzymes, and identified residues in the RING1 and RING2 domain critical for its ubiquitination activity and protein stability. *Pf*RBR-E3 ligase exhibits differences in immunofluorescence profile upon exposure of the parasite to different genotoxic (MMS) and proteotoxic (MG132, FCCP and artemisinin derivative) stress. (Kumari et al, *Proteins*, 2025). This work is being carried forward to identify the interacting partners of RBR-E3 ligase and its E2s.

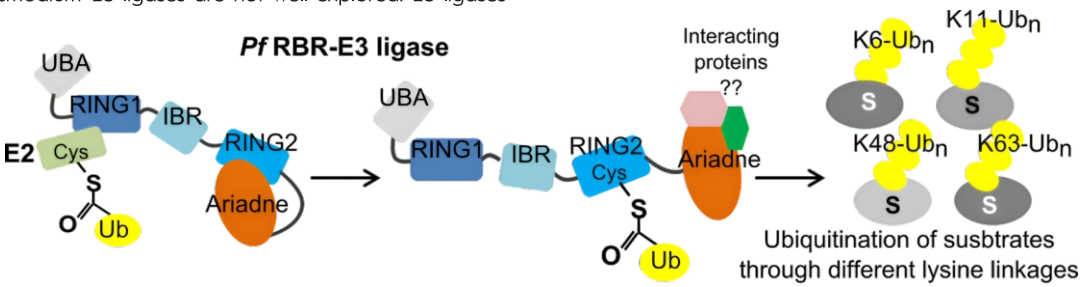


Figure 7. The graphical representation summarizing the experimental findings of functional characterization of *Pf*RBR-E3 ligase and identification of residues critical for its ubiquitination activity (Ile192 in RING1 domain and Cys362 and Cys367 in RING2).

3.2 Leishmaniasis

3.2.1 Targeting the Glycolytic Pathway in *Leishmania donovani*

Trypanosomatid glycolysis is unique because it is compartmentalized in unique peroxisome-like organelles called glycosomes (absent in the host). The seven initial steps of the glycolytic pathway, from glucose to 3-phosphoglycerate are localized in these glycosomes. Also, there are differences between human and parasite glycolytic enzymes. Selective inhibition of any of these essential enzymes in the parasites should lead to the arrest of the glycolytic flux, thus affecting the parasite's survival. We have evaluated a few pyruvate derivatives that are known to inhibit glycolysis for anti-proliferative activity in *L. donovani*. We found that ethyl bromopyruvate (EBP) shows good in-vitro activity in both promastigotes (IC_{50}=6.8±0.5µM) and intracellular amastigotes (IC_{50}=10.6±4.9µM) stages of *L. donovani*. Its selective index is about 5 which is similar to miltefosine. Ultrastructural analysis was performed to visualize the morphological effects and sub-cellular targets of EBP in promastigotes and amastigotes. Significant reduction in cell bodies and flagellar length was noted in promastigotes, along with damage to the flagellar pocket, mitochondrion, and parasite cytoskeleton. Numerous autophagosome-like vacuoles were also observed. Biochemical assays indicated that EBP triggers the generation of reactive oxygen species (ROS), leading to elevated cytosolic calcium, disruption in mitochondrial function, impaired ATP production, DNA fragmentation, and ultimately, apoptosis-like cell death in the parasite. Further studies are in progress.

3.2.2 Drug-resistant *Leishmania donovani* Interferes with Host-mediated Ubiquitin-Immune Recognition to Promote its Survival and Replication

Ubiquitination/ deubiquitination processes are essential for host and microbial cell biology and physiology, and defects in such processes cause many malfunctions in organisms. Host-mediated ubiquitination of parasitophorous vacuoles (PVs) is important for the detection and destruction of PVs by hosts' innate immune response. Since PV ubiquitination is detrimental for pathogens, many microbial pathogens have developed the means to interfere in ubiquitination pathways to promote their survival and replication inside the host. We hypothesised that *Leishmnaia* being a vacuolar pathogen is subjected to host ubiquitin-immune recognition and drug-resistant (e.g., Antimony (Sb)-resistant) *L. donovani* are equipped with unique virulence factors to subvert PV ubiquitination pathways and establish severe infections.

Our primary data suggests that *L. donovani (Ld)* containing vacuoles are decorated with ubiquitin (Figure 9A) and targeted by autophagy adaptors p62 / NDP52 to facilitate their delivery to the autolysosomal compartments (Figure 9B). Moreover, Antimony-resistant *Leishmania* strains are more infective and more efficiently inhibit host ubiquitin immune recognition compared to Antimony-sensitive strains (Figure 9, unpublished).

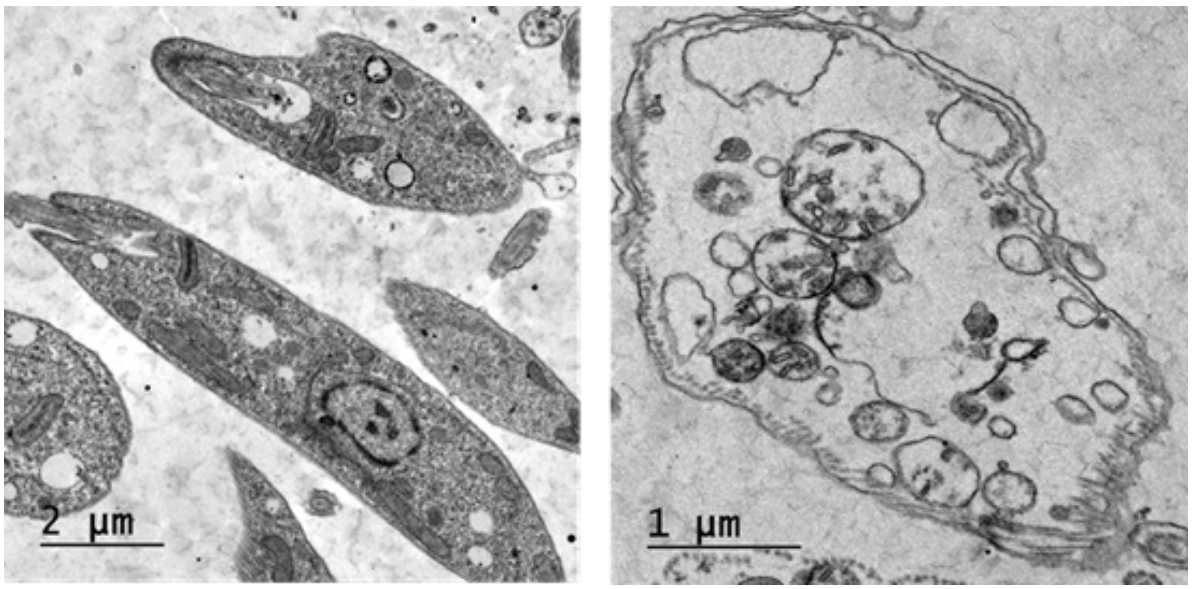


Figure 8. Representative TEM micrographs of *L. donovani* promastigotes revealing the ultrastructural effects of EBP. (A) untreated parasites display elongated cell bodies with normal sub-cellular organization while (B) parasites treated with 7 µM EBP for 24 h showed marked sub-cellular alterations in flagella (F), mitochondria (M) and cytoskeleton (C).

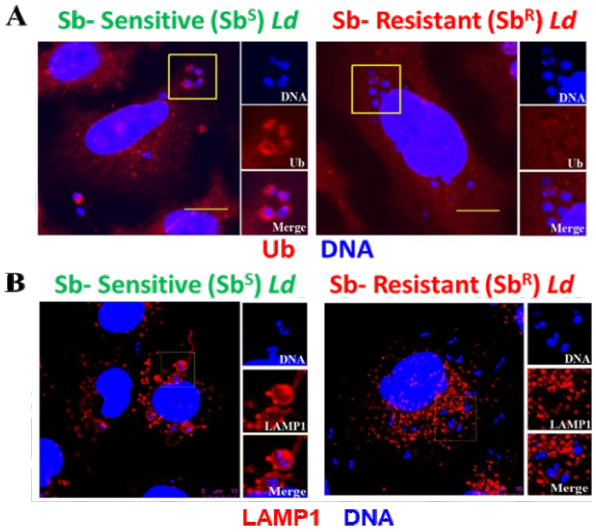


Figure 9. Antimony (Sb)-resistant *L. donovani* interferes with host-mediated ubiquitin-immune response.: **(A & B)** Human A549 cells were infected with Antimony-sensitive (SbS-*Ld*) and Antimony-resistant (SbR-*Ld*) *L. donovani*. Cells were fixed with Methanol, stained with **(A)** Ubiquitin (Ub) and **(B)** LAMP1 specific primary antibodies at 18 hpi and at 6 hpi respectively. Finally, cells were stained with DAPI and Alexa Fluor-568. Ub/LAMP1 positive vacuoles were quantified. One of the representative confocal images is shown here.

It was found that Antimony (Sb)-resistant *L. donovani* (SbRLd) strains survive and replicate faster inside host cells compared to the Antimony (Sb)-sensitive *L. donovani* (SbSLd) (Figure 10A). We hypothesised that *L. donovani* either secret its own deubiquitinating enzymes (DUBs) or hijack host's DUBs to block this ubiquitin immune recognition by host. *Leishmania* spp have their own DUBs which facilitate *Leishmania* amastigotes to replicate. We found that a couple of *Leishmania*-DUBs (*Ld*-DUBs) are highly expressed in SbRLd infected host cells compared to SbSLd infected host cells (Figure 10B). One or more of these DUBs might play important role in *Leishmania* pathogenesis and inhibit host's ubiquitin immune recognition to get resistance. The role of *Ld*-DUBs in parasite infection is being investigated to probe the potential of *Ld*-DUBs as drug targets in this parasite.

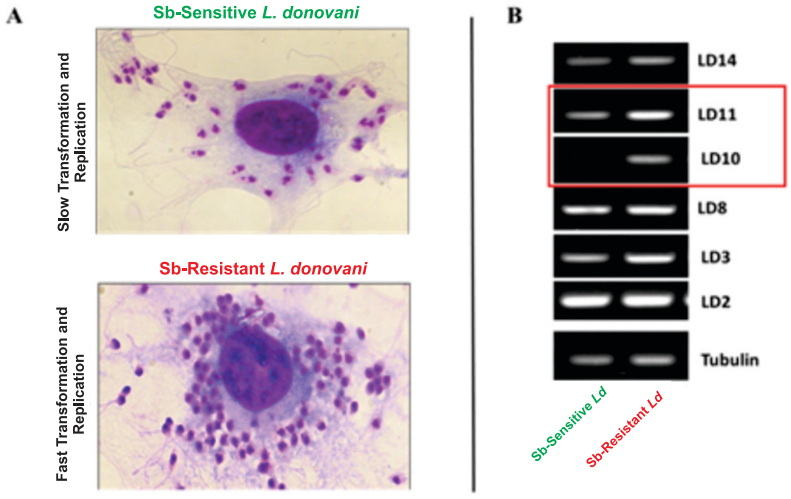


Figure 10: Differential expressions of *Leishmania*-DUBs (Ld-DUBs) in Antimony (Sb)-sensitive vs Antimony (Sb)-resistant *L. donovani*: (A) Human A549 cells were infected with Antimony (Sb)-sensitive and Antimony (Sb)-resistant *Leishmania donovani* and at 6 hours post infection (hpi) the cells were fixed with Methanol, stained with Giemsa. Representative images are shown here. (B) Cells were infected with either Antimony -sensitive (SbS-*Ld*) or Antimony-resistant (SbR-*Ld*) *L. donovani* for 24 hours. At 24 hpi the cells were harvested and m-RNAs were isolated from the infected cells. The expression levels of different Ld-DUBs that are known to be important for intracellular amastigote proliferation were checked by RT-PCR.

3.2.3 RNA Editing Ligase 1 of *Leishmania donovani* (LdREL1) Regulates Mitochondrial Metabolism and Parasite Survival Inside the Host

LdREL1 plays a crucial role in the survival of *L. donovani* inside the macrophages and virulence in mice by regulating the activity of complex-III (cyt.b) and -IV. Parasites undergo a metabolic shift to adapt to the intracellular environment, and the increased COX activity is part of this metabolic shift. Elevated mitochondrial activity plays an important role in the survival of amastigotes inside the host cells. For ATP production, intracellular amastigotes depend mainly on the TCA cycle and mitochondrial respiration rather than on glycolysis. The study revealed that LdREL1 deleted parasites (LdREL1$^{-/-}$) have no capability to proliferate *in vitro* (in human macrophages) and *in vivo* (in mice). The inability of the LdREL1$^{-/-}$ parasites to survive in the host is because of the REL1-mediated loss of the activity of complex-III and -IV, which in turn is the result of lower levels of cyt.b and cox, along with reduced ATP production by oxidative phosphorylation. Amastigote proliferation, both in macrophages and mice, was restored by episomally expressing LdREL1 in LdREL1$^{-/-}$ parasites, and therefore, LdREL1 is an important factor for amastigotes virulence. The study, for the first time, demonstrated that *Leishmania donovani* LdREL1 being an RNA editing pathway protein, is involved in mitochondrial metabolism (ETC, ATP production) by regulating Cyt.b (complex-III) and COX (complex-IV) activity and consequently regulates amastigotes survival inside human macrophages and virulence in mice by controlling ETC, oxidative phosphorylation and ATP production.

3.2.4 Developing an *In vitro* Model for PKDL to Explore the Mechanistic Insights of Disease, Diagnosis, and Therapy

Post-Kala-azar Dermal Leishmaniasis (PKDL) presents a significant challenge to the elimination of visceral leishmaniasis (VL) in the Indian subcontinent, especially in regions where *L. donovani* infection prevails. In the context of disease eradication, screening of

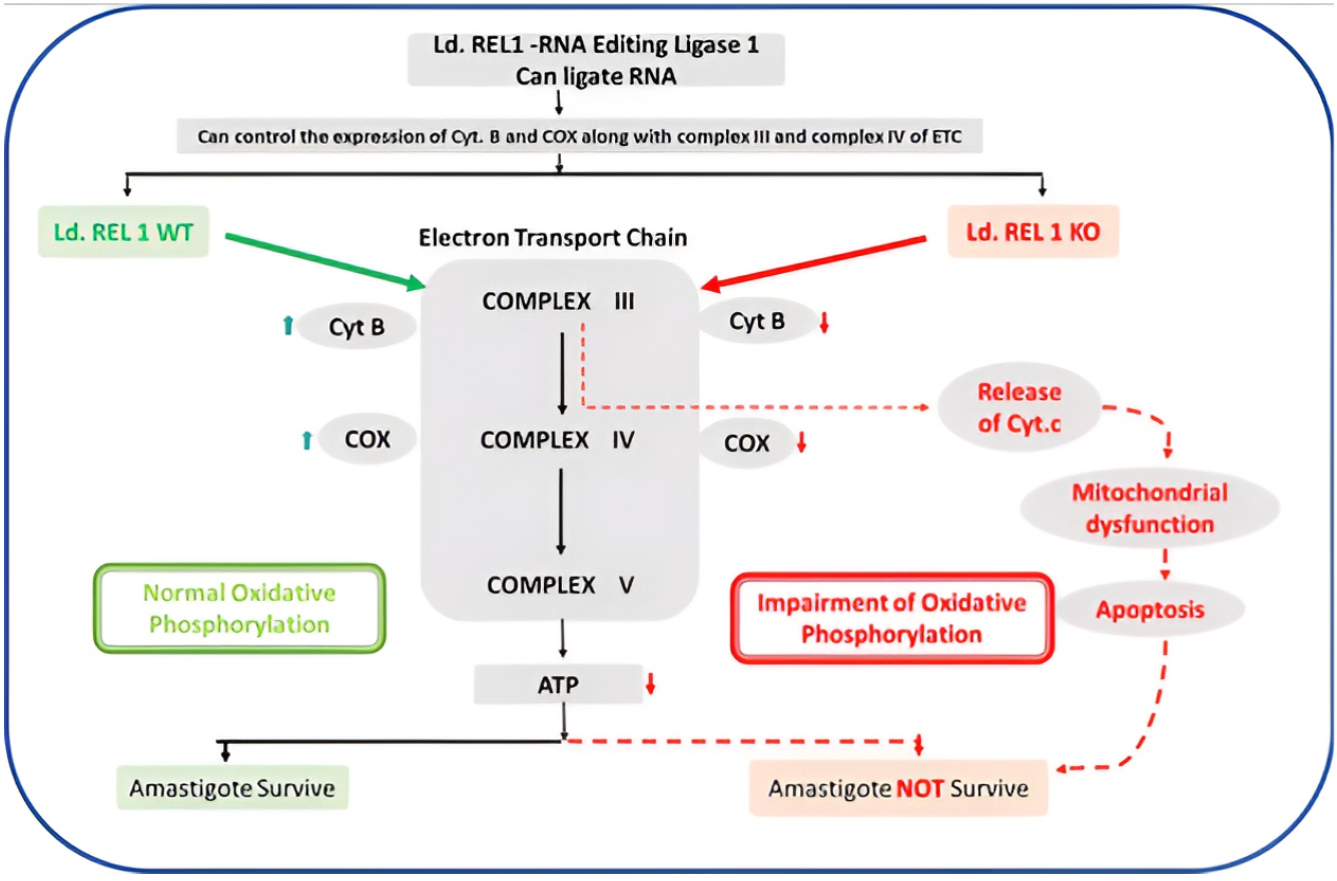


Figure 11. Model showing the phenomena controlled by LdREL1 other than RNA editing. Deletion of one allele of LdREL1 (LdREL1 KO) downregulates the expression of cyt.b and COX and thereby reduces the level of activity of ETC complex-III and complex-IV, and, consequently oxidative phosphorylation is impaired, and ATP synthesis is hampered (reduces). Interference with ETC induces the release of cyt.c from mitochondria along with loss of mitochondrial membrane potential. Finally, parasites undergo apoptosis. So, LdREL1 controls the expression of cyt.b and COX (components of complex-III and complex-IV respectively), and thereby controlling the activity of ETC complex-III and complex-IV. Consequently, it regulates ATP synthesis, oxidative phosphorylation, and parasite survival inside the host.

parasite reservoirs (asymptomatic cases) and identifying new drug development strategies, there is a need for development of an *in vitro* PKDL model PKDL appears in early macules, plaques and nodules. Reports suggest that Leishmania parasite tends towards increased glycolysis through excess biogenesis of the Glycosome to combat drug induced stress and death (miltefosine and antimonial drugs). Also, Leishmania is able to gain antimicrobial resistance though horizontal gene/protein transfer by extracellular vesicles. We thus propose that PKDL could be a manifestation of drug-adapted parasites' increased glycolysis (Warburg effect like a condition seen in cancer microenvironment) which would drive immune evasion and persistence under the skin. We propose to explore the extracellular vesicles (EVs) of drug-resistant *L. donovani* (not explored for PKDL). and possibilities for establishing an *in vitro* model of melanocyte/keratinocyte - parasite infected macrophage co-cultures or skin organoid based PKDL model to explore clues on molecular interactions, early diagnosis and to screen novel drug molecules. In this project, we have have started human primary keratinocyte and melanocyte cultures for optimizing the co-cultures. Alongside, *L. donovani* wildtype and SSG resistant strains have been cultured successfully.

3.2.5 Development of Multi-protein Vaccine Prototypes and their Immunotherapeutic Efficacy Against Experimental Visceral Leishmaniasis

Visceral leishmaniasis in India, while at the verge of elimination, has a widened challenge of its sustenance due to increase in the number of PKDL cases and asymptomatic sero-positivity in the endemic areas. Apparently, the drugs alone are insufficient to prevent the *Leishmania* parasite from circulation which can eventually leads to recurrence of the disease. Hence, alternatives are urgently required eliminate the parasite from circulation in the endemic population. Our laboratory has been working on development of vaccine against the Indian VL and several antigens have been identified from the indigenous clinical isolate of *Leishmania donovani*. Through rigorous screenings in both prophylactic and therapeutic modes using golden hamster as chronic infection model and the kala-azar patient samples, most promising Th1 stimulating proteins were selected. Three highly efficacious antigens, namely, Enolase (E), Aldolase (A) and Triosephosphate isomeras (T) were implicated in designing three chimeras (EA, AT and TE) to impart the antigen a wider coverage of immunodominent epitopes and engagement of favourable

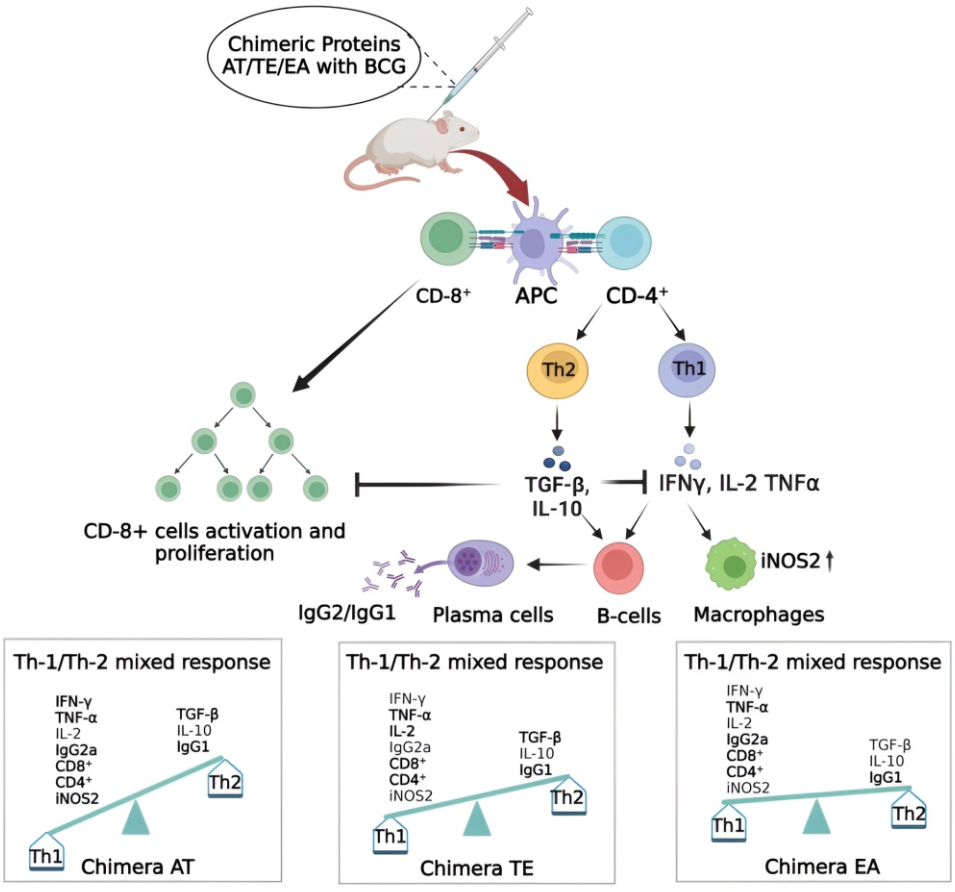


Figure 12: Comparison of immune responses elicited by EA, AT and TE chimeras in BALB/c mice. (BioRender Gupta R. http://BioRender.com/p84l550).

immunological signalling. Immunogenicity assessment of the three chimera antigens in the BALB/c mice revealed robust Th1 immune response (both cellular and humoral) compared to the individual proteins, while AT demonstrated better immunogenic response among the three chimeras. Further immunotherapeutic evaluation of the chimeras in golden hamsters revealed >70% reduction in the parasitic load in all the three chimera antigens, with a particularly robust cellular immune response observed with the AT chimera. The antigenicity results from BALB/c mice were well corroborated with the immunological response in golden hamsters. Analysis of these antigens in the treated patient samples for immunological memory is planned.

3.3 Lymphatic Filariasis

3.3.1 Infective Larvae of *Brugia malayi* (Bm-L3) Modulate the Functions of Host Macrophage Subsets

Filarial parasites dampen the antigen processing and presentation capabilities in the host to subvert the host immune response. The balance between the two activation stages of macrophages (classical vs. alternative activation) is an important factor that determines the inflammatory pathology associated with filariasis. We evaluated the expression of maturation and co-stimulatory markers in FACS-sorted large and small peritoneal macrophages (LPM and SPM) post infection with the infective larvae of *B. malayi* (Bm-L3) and observed that LPMs and SPMs differentially regulated the expression of CD40, CD80, CD86, and MHC II during the early (day 7) and late (day 28) phase of infection (Figure 13 A). Bm-L3 also differentially modulated the expression of various TLRs on LPMs and SPMs during the first 2 weeks of infection (Figure 13B). The result suggests that maximum immunomodulation of the host cells happens during the first two weeks of infection, overcoming the same is the key to controlling the establishment of filarial infection.

3.4 Medicinal Chemistry and Anti-Parasitic Drug Discovery

3.4.1 Synthesis and Biological Evaluation of Compounds as Antimalarials

424 compounds were screened from April 2024-March 2025 for *P. falciparum* (blood stage). Out of these, 40 compounds had IC_{50}<1 µM in CQ-sensitive strain (3D7). Amongst the tested compounds, 15 compounds showed activity in the 0.08-0.5 µM in CQ-sensitive and resistant strains with a cytotoxicity in the range of 50-200 µM. A total of 168 compounds were screened against *P. berghei* liver stages, and 19 compounds were active. *In vitro* active 7 antimalarial compounds were evaluated for their activity *in vivo* in mice. The compounds showed growth inhibition, but none of them were curative. Further SAR is underway to improve the antimalarial activity and solubility of compounds.

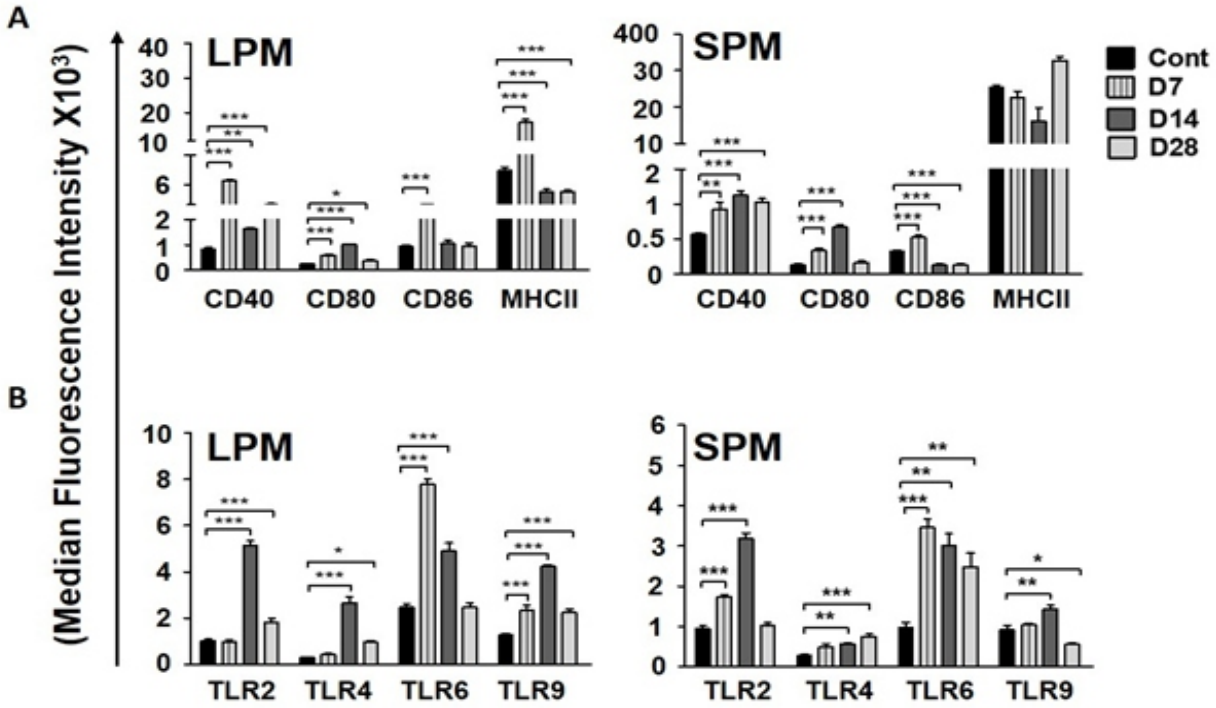


Figure 13: Bm-L3 infection impairs LPMs and SPMs. Flowcytometry based expression of (A) Maturation and co-stimulatory markers and (B) Toll like receptors on FACS-sorted LPMs and SPMs from uninfected control and Bm-L3 infected mice at day 7, 14 and 28. Values shown are Mean ±SD from three independent experiments with 3-5 mice/group.

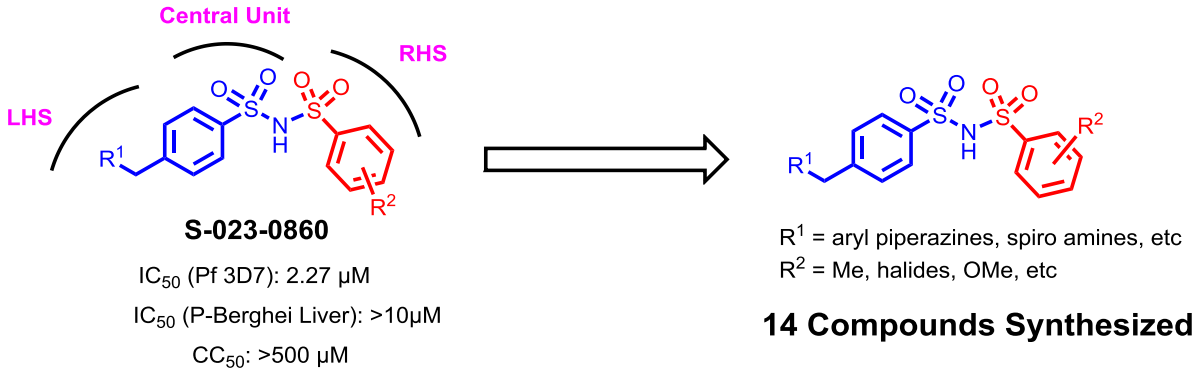


Figure 14. Modification of S-023-0860 to improve activity.

50 compounds from other CSIR labs and 20 compounds (external services) have been evaluated for antiplasmodial activity.

Of the CDRI compounds, 135 compounds belonged to imidazo-fused aza-β-carboline, thieno[2,3-*d*]pyrimidin-4(3*H*)-one, pyrazoles, and chromene class of molecules (synthesized by Batra et al.). Several compounds belonging to these different classes displayed significant antiplasmodial activity. From the pyrazole class, compounds S-024-1125, 1128, 1131 and 1198 displayed activity of less than 0.5 µM in the 3D7 *P. falciparum* strain and also displayed significant activity in the KI CQR *P. falciparum* strain. Compound S-024-1198 with IC_{50} of 0.076 M against CQS 3D& and 1.4 M against KI strain with SI of 56 was the most potent compound. Likewise from the chromene series of compounds (25) most of the analogs diplayed antiplasmodial activity with IC_{50} ranging from 0.086 to 0.522 µM against the 3D7 strain and 0.94 to 1.32 µM against the K1 strain. Even from the imidazo-fused aza--carbolines (55), several analogs displayed antiplasmodial effect with IC_{50} ranging from 0.27-1.6 µM against 3D7 strain.

Compound S-023-0860 showed promising activity with high CC_{50} (Figure 14). In an attempt to study SAR, a few molecules were generated against the 3D7 *P. falciparum* strain by varying aryl moieties having electron donating and withdrawing substitutions on RHS of the compound (S-023-0860) to improve its activity. Biological screening of the generated molecules is underway. In the next phase, more molecules will be generated by varying functional groups on LHS the compound (S-023-0860) to improve its activity.

3.4.2 Synthesis and Antileishmanial Evaluation of Compounds

396 compounds were screened against *L. donovani* using the macrophage-amastigote model. 11 compounds belonging to the imidazo-fused betacarbolines, 1 from quinoline-piperazine and 2 from pyrone-triazoles were found to be active with IC_{50} values ranging from 0.6 to 5 µM and SI>20. Two compounds, S-022-476 and 807, which were identified as hits from earlier screening were prepared in 500 mg quantity for carrying out the preliminary pharmacokinetics and toxicity study.

3.4.3 Anti-filarial Drug Discovery

24 compounds belonging to the different chemical classes viz., Phthalazinone, Indole, Glycosyl benzenesulfonamide, Glycosyl sulfonamide Glycosyl tosylate, glycosyl bitosylate and Pyrone-triazole hybrid were screened for their anti-filarial activity using motility assay for both *Brugia malayi* adult worm, and *B. malayi* Microfilariae (Bm-Mf), and MTT reduction assay (for *B. malayi* adult worms only). None of the compounds showed promising adulticidal activity. However, ongoing studies with the S-019-0277 (Quinoline-Triazole hybrid) that was previously found active in *in vitro* and *in vivo* assays against *B. malayi* showed that the compound was stable in Mastomys plasma and microsome upto 4 h, and 1h, respectively. Further, it showed more than 80% stability in SGF & SIF. Acute toxicity study in Swiss mice revealed MTD to be 2 g/Kg body wt. At this dose, no mortality was seen, and no adverse events were observed (behaviour, body wt., food/water intake, gross organ morphology). Further studies are underway.

4 Viral Infections

Vision :

Fundamental Research on infection pathogenesis with translational implications

Goals :

- Drug discovery for alleviating nationally important viral diseases
- Drug repurposing platforms for emerging viral diseases
- Diagnostics for early detection of viral diseases
- Safe and cost-effective Vaccine development

First Row (L to R): Dr. Ravishankar Ramachandran, Dr. Raj Kamal Tripathi, Dr. Ajay Kumar Srivastava, Dr. Ravindra Kumar, Dr. Chandra Bhushan Tripathi
Second Row (L to R): Dr. Rahul Shukla, Dr. Chetan Meshram, Dr. Sourav Haldar, Dr. Mohammad Imran Siddiqi, Dr. Kishor Mohanan

4.1 Progress in Research and Development Program

4.1.1 Antiviral Screening of Compounds

Based on the current viral infections of public health importance in India, the Virus Research and Therapeutics (VRT) Division has fully validated a high-throughput flow cytometry-based antiviral screening assay against Chikungunya, Dengue, and Japanese encephalitis virus, and is currently in development for Chandipura, KFD, and Zika viruses. More than 600 compounds were received for antiviral testing at the VRT division through numerous interinstitutional and private collaborations for antiviral development. For Dengue virus (DENV), we have screened more than 500 compounds with 10 hit molecules (IC50 < 5uM). For chikungunya virus (CHIKV) and JEV, more than 50 and 30 compounds were screened, respectively, and three hits each were identified. All the hits are being pursued for lead development with the help of an organic chemist using in-house and extramural funding. Under the Anti-viral Mission project by CSIR, three leads were identified as anti-COVID-19. Two of these molecules (S-024-744 and S-024-110) were further evaluated in the Hamster model, and they showed comparable efficacy with remdesivir.

Also screened > 100 phytopharmaceutical compounds against DENV1-4 received from NBRI, Lucknow.

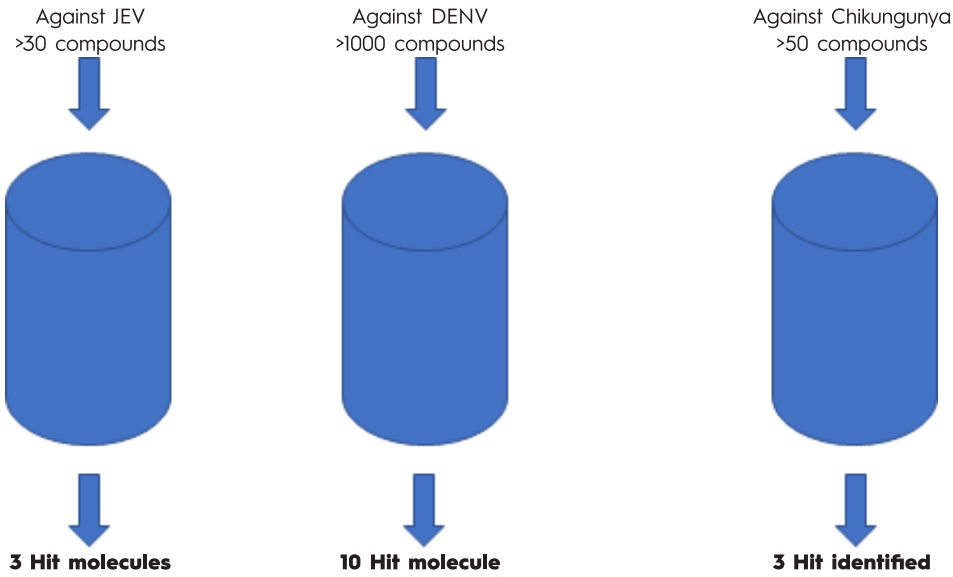
4.1.2 SAR Optimization of Hit Compounds

Under the BFI-Biome research project, a series of quinoline, indole-derived hybrids were evaluated against the four serotypes of DENV. SAR optimization around the primary hit KM-11089 obtained through rational design as an RdRp inhibitor has been performed. Several primary hits with IC50 in the submicromolar range were obtained. Further evaluations are currently underway.

4.1.3 *In silico* Screening of Compound Libraries for Hit Identification

The viral targets for the antiviral discovery and development program have been marked for each virus. To spearhead the antiviral discovery efforts, various chemical libraries are screened with the help of the Bioinformatics team at CDRI. For Dengue and JEV, Maybridge library was screened with protease and RdRp as targets. Initial hits were validated for antiviral activities and target engagement using binding and enzymatic assays. These hits are being validated further, and SAR around the scaffold is being designed.

- Dr. Ravishankar Ramachandran
Chief Scientist &
Area Coordinator



4.1.4 Viral Target-Based Activity/ Enzymatic Assay Development: CHIKV nsP2 Protease Activity Assay

Viral protease is an important target for antiviral development for many viruses. Many protease inhibitors are approved by the FDA as antivirals against HCV, HIV, and SARS CoV2. For CHIKV, we have developed a FRET-based nsP2 protease activity assay using an internally quenched peptide derived from the CHIKV ¾ cleavage site (RAGG/YIFS) with an N-terminal DABCYL quencher and a C-terminal Glu-EDANS fluorophore. The assay has been optimized for substrate and enzyme concentration in 20ul enzymatic reactions in 384-well, black nonbinding plates. The assay was further optimized for selectivity using a known FDA-approved HIV protease inhibitor, Darunavir. The assay will be further optimized for specificity and selectivity using published cysteine protease inhibitors.

4.1.5 Viral Protease Enzymatic Assay for Dengue and JE Viruses

We have also established and validated target-based assays such as protease and NS3-NS4b helicase for dengue virus and RDRP for JE virus. In a nutshell, the department is fully equipped to screen antivirals against dengue and Japanese Encephalitis Viruses.

4.1.6 Developing Peptide-Based Fusion Inhibitors as an Antiviral Strategy Utilizing Coronin 1 as a Template

Enveloped viruses can enter the host cells by endocytosis and subsequently fuse with the endosomal membranes, or fuse with the plasma membrane at the cell surface. The crucial stage of viral infection, regardless of the route taken to enter the host cell, is membrane fusion. The present work aims to develop peptide-based fusion inhibitors that prevent membrane fusion by modifying the properties of the participating membranes, without targeting a specific viral protein. This would allow us to develop a fusion inhibitor that might work against a larger spectrum of enveloped viruses as it does not target any specific viral fusion protein. With this goal, we have designed a novel peptide by modifying a native sequence derived from coronin 1, a phagosomal protein, that helps to avoid lysosomal degradation of mycobacterium-loaded phagosomes. The designed peptide, mTG-23, inhibits ~ 30- 40% fusion between small unilamellar vesicles containing varying amounts of cholesterol by modulating the biophysical properties of the participating bilayers. As a proof of principle, we have further demonstrated that the mTG-23 inhibits Influenza A virus infection in A549 and MDCK cells (with~ EC50 of 20.45 µM and 21.45 µM, respectively),

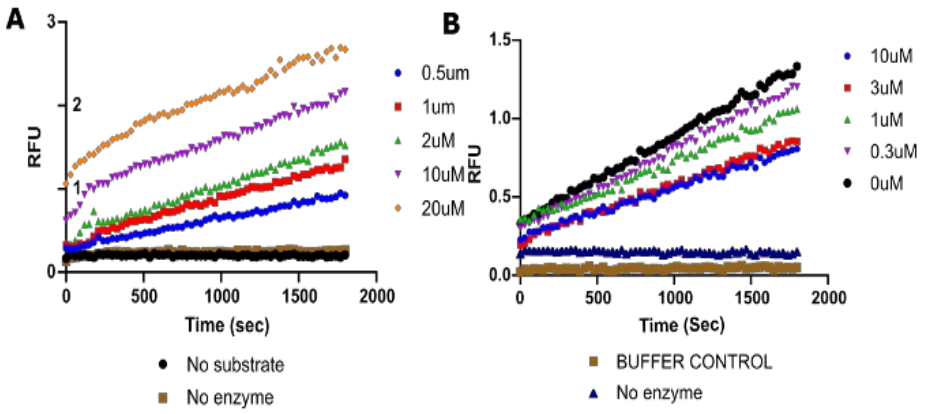


Figure: Optimization of CHIKV nsP2 Protease activity assay. A. Optimization of substrate and enzyme concentrations for the protease assay. B. Anti-protease activity of Darunavi, an FDA-approved HIV protease inhibitor, at select concentrations in CHIKV nsP2 protease activity assay.

- Dr. Raj Kamal Tripathi
Senior Principal Scientist & Area Coordinator

where viral envelope and endosomal membrane fusion is a crucial step. Through a gamut of biophysical and biochemical methods, we surmise that mTG-23 inhibits viral infection by inhibiting viral envelope and endosomal membrane fusion. We envisage that the proposed antiviral strategy can be extended to other viruses that employ a similar modus operandi, providing a novel pan-antiviral approach (**Panda et al., RSC Med Chem., 2025, 16: 125-136**).

4.1.7 Identification and Characterization of a Novel Protein-Protein Interaction Among SARS-CoV-2 Nucleocapsid, host SFPQ and hnRNP U and its Potential Role in Virus Replication

SARS-CoV-2 has led to significant global health and economic challenges and caused the COVID-19 pandemic. The ability of the virus to replicate adeptly within host cells is critical for its pathogenicity. The structural nucleocapsid (N) protein of SARS-CoV-2 packages newly synthesized viral RNA with the association of various host proteins that may contribute to different functions in maintaining a productive viral life cycle. In this study, we report the identification and characterization of host proteins SFPQ and hnRNP U interacting with SARS-CoV-2 N protein in both N-transfected cells and virus-infected cells, forming a hetero-trimeric protein complex. Using carefully designed peptides that span the length of N protein and competitive inhibition, we identified the interacting domains at N protein that interact with SFPQ and hnRNP U. Our results constitute the first report that the characterized N protein and host SFPQ and hnRNP U form a hetero-trimeric protein complex in both N transfected cells and virus-infected cells. Utilizing competitive peptides, we were able to disrupt the hetero-trimeric protein complex in virus-infected cells, leading to reduction in viral replication. These results clearly demonstrate that N-SFPQ-hnRNP U hetero-trimeric protein complex formation is found in SARS-CoV-2 infected cells that regulate viral replication. Our findings suggest that the protein-protein interaction (PPI) between N-SFPQ-hnRNP U hetero-trimeric protein complex could be a novel drug target for developing therapeutics against COVID-19 (**Biology of the Cell, 2025; 117:e70008, https://doi.org/10.1111/boc.70008**).

- Dr. Ajay Kumar Srivastava
Principal Scientist
& Area Coordinator

5 Cancer

Vision :

To undertake fundamental & translational research focusing on cancers of national relevance

Goals :

- Affordable cancer care for Indian patients
- Deep understanding of disease biology for new target discovery
- Development of Indian patient centric preclinical cancer models
- Natural product driven cancer therapy

Front Row (L to R): Dr. Monika Sachdev, Dr. Gautam Panda, Dr. Arun Kumar Trivedi, Dr. Dipak Datta, Dr. Jayanta Sarkar, Dr. Dibyendu Banerjee, Dr. Shakil Ahmed, Dr. Smriti Bhaduria

Second Row (L to R): Dr. Mohammad Sohail Akhtar, Dr. Valmik Shinde, Mr. Sanjeev Meena, Mr. Shyam Singh, Dr. Dipankar Koley, Dr. Durga Prasad Mishra, Dr. Damodara Reddy N

5. Recent Developments

Being a Nodal laboratory, Cancer Biology Division of CDRI is leading the PAN CSIR Cancer Research Program to make Cancer Care Affordable for Indian patients.

Title of the Project is "**Empowering Women's Health: Focusing on Breast and Gynaecological Cancers of Indian Relevance**"

5.1 Process Development of to be Off-Patented APIs

Process for Preparation of Phthalazinone Derivatives (Olaparib) and Uses Thereof

Olaparib is a drug that is used to treat ovarian, breast, prostate, and other cancers. It belongs to a class of drugs called PARP inhibitors. Olaparib blocks an enzyme called PARP which cancer cells need to survive. Olaparib is available as a tablet and capsule. It is taken by mouth, usually once a day. Olaparib is used to treat ovarian cancers that have stopped responding to other treatments. It may also be used to treat breast cancers that have spread to other parts of the body. The increasing incidence of cancer and rise in the number of patients who are diagnosed with the disease, coupled with the prevalence of hereditary cancers, will drive growth for this market over the forecast period.

Olaparib has been synthesized up to 10gm scale with overall yield 30% in four synthetic steps.

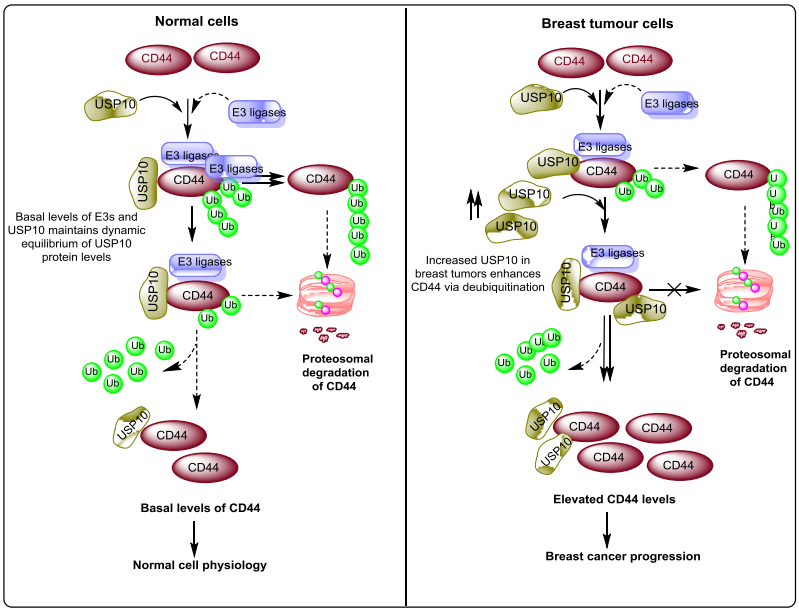
5.2 Promising Leads

We have a novel Smac mimetic (S-016-1348) as one of our advanced leads in cancer area. Recently, we filed an PCT for the same. Acute and chronic studies are ongoing.

5.3 Fundamental Research

USP10 Deubiquitinates and Stabilizes CD44 Leading to Enhanced Breast Cancer Cell Proliferation, Stemness and Metastasis

Despite extensive research, strategies to effectively combat breast cancer stemness and achieve a definitive cure remains elusive. CD44, a well-defined cancer stem cell (CSC) marker is reported to promote breast cancer tumorigenesis, metastasis, and chemoresistance. However, mechanisms leading to its enhanced expression and function is poorly understood. Here, we demonstrate that USP10 positively regulates CD44 protein levels and its downstream actions. While USP10 depletion prominently down-regulates CD44 protein levels and functions, its overexpression significantly enhances CD44 protein levels, leading to enhanced cluster tumor cell formation, stemness, and metastasis in breast cancer cells both *in vitro* and *ex vivo* in primary

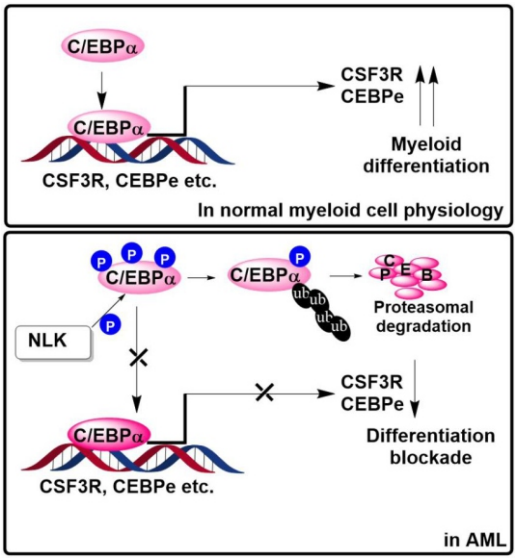


- Dr. Dipak Datta
Senior Principal Scientist & Area Coordinator

human breast tumor cells. USP10 interacts with CD44 and stabilizes it through deubiquitination both in breast cancer cell lines and human breast cancer-derived primary tumor cells. Stabilized CD44 shows enhanced interaction with cytoskeleton proteins Ezrin/Radixin/Moesin and potently activates PDGFRβ/STAT3 signaling which are involved in promoting CSC traits. Using USP10 stably expressing 4T1 cells, we further demonstrate that the USP10-CD44 axis potently promotes tumorigenicity *in vivo* in mice, while simultaneous depletion of CD44 in these cells renders them ineffective. In line with these findings, we further showed that inhibition of USP10 either through RNAi or the pharmacological inhibitor Spautin-1 significantly mitigated CD44 levels and its downstream function *ex vivo* in primary breast tumor cells. Finally, we demonstrated that primary breast tumor cells are more susceptible to chemotherapy when co-treated with USP10 inhibitor indicating that the USP10-CD44 axis could be an attractive therapeutic target in combination with chemotherapy in CD44 expressing breast cancers. ***(Biochem J. 2024 Dec 18;481(24):1877-1900. PMID: 39564770).***

Nemo-like Kinase Blocks Myeloid Differentiation by Targeting Tumor Suppressor C/EBPα in AML

CCAAT/enhancer-binding protein α (C/EBPα), a key myeloid transcription factor, drives myeloid differentiation from blast cells by regulating the expression of granulocyte colony stimulating factor receptor and C/EBPε as required for promoting granulocyte differentiation. Here, we show that serine/threonine-protein kinase NLK, also known as Nemo-like kinase, physically associates with C/EBPα and phosphorylates it at multiple sites, including Ser21, Thr226, Thr230 and S234, leading to its ubiquitin-mediated degradation. Individual phospho-point mutants of C/EBPα could be phosphorylated by NLK, but a mutant with all phosphorylatable residues replaced by alanine resisted phosphorylation and degradation by NLK, as did the single point mutants. Furthermore, although ectopic expression of NLK enhanced phosphorylation of C/EBPα levels, it markedly inhibited total C/EBPα protein levels. Conversely, NLK depletion inhibited endogenous C/EBPα phosphorylation but enhanced its total protein levels in several acute myeloid leukemia (AML) cell lines and in peripheral blood mononuclear cells isolated from number of AML patient samples. Importantly, NLK depletion in peripheral blood mononuclear cells from primary AML patients not only restored C/EBPα protein levels, but also induced myeloid differentiation, suggesting that NLK could be therapeutically targeted to restore C/EBPα to resolve differentiation arrest in AML. ***(FEBS J. 2024 Oct;291(20):4539-4557. PMID: 39110129).***



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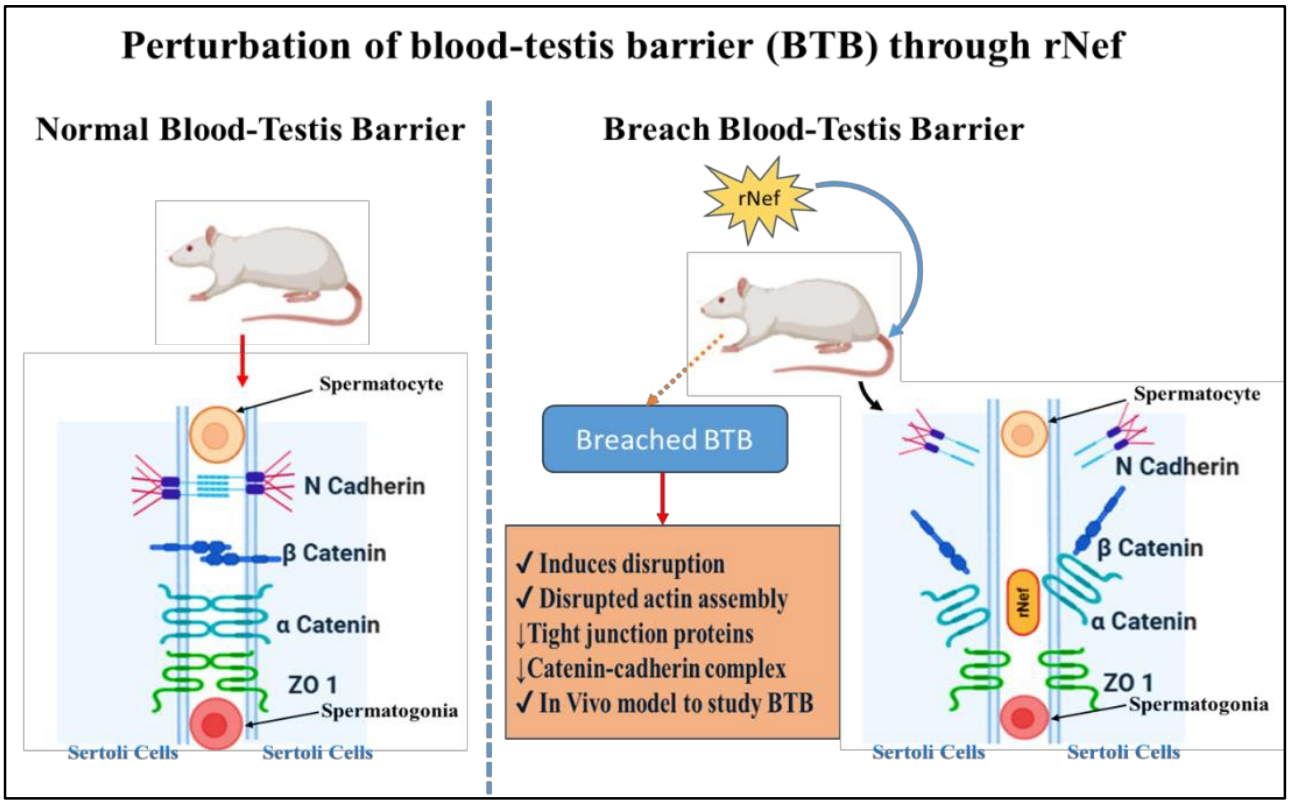

HIV1-Nef Perturbs the Integrity of Blood Testis Barrier in Rat Model

The blood-testis barrier is a specialized feature within the mammalian testis, located in close proximity to the basement membrane of seminiferous tubules. This barrier serves to divide the seminiferous epithelium into distinct basal and adluminal (apical) compartments. The selectivity of the BTB to foreign particles makes it a safe haven for the virus, and the high affinity of HIV for testis might lead to the vertical transmission of the virus. In the present study, recombinant HIV1-Nef (rNef) protein was injected intravenously to examine the effect of rNef on BTB. SD male rats received 250 µg and 500 µg of rNef along with 2% Evans blue dye within 1 ml through the tail vein. After 1 hour of perfusion, the animals were sacrificed for analysis. The dye migration assay and ELISA confirmed a significant impairment in the blood-testis barrier (BTB) and the manifestation of rNef in testes tissues, respectively. Moreover, a decline in the expression of tight junction proteins, including ZO1 and Occludin, was observed during rNef-induced BTB disruption. Overall, our findings demonstrated that rNef induces BTB disruption through various signaling events. At the site of ectoplasmic specialization of the seminiferous epithelium, the localization of cadherins was found to be disrupted, making the testis a vulnerable site. In conclusion, rNef perturbs the integrity of the blood-testis barrier in rat models; hence, it can also serve as a suitable model for studying the dynamics of the blood-testis barrier. (**Tissue Barriers https://doi.org/10.1080/21688370.2024.2357406**)

Restoration of p53 Up-regulates POTE-Paralogs in Cervical Cancer Cell Line CaSki through the Silencing of E6/E7 Onco-Proteins of HPV-16

Cancer is a broad collection of illnesses that can begin in any tissue or organ of the body. The rate of high fatality in case of cancer is due to delayed diagnosis and drugs resistant properties of tumors cells. To overcome these issues, our lab characterises various cancer biomarkers, which are known as Cancer Germline Antigens (CGA). In the normal condition, expression of these proteins are limited only to germ cells, but overexpression observed in cancerous cells or tissues.

POTE is a highly homologous gene family that is exclusively expressed in the prostate, testis, ovary, placenta, and prostate cancer. Thirteen highly similar paralogs are spread throughout eight chromosomes in humans. The three domains that each POTE paralogs carries are encoded, and the sizes of the proteins differ significantly. The NH2-terminal domain is a novel domain that lacks a signal sequence but looks like an extracellular domain. Ankyrin repeats and spectrin-like helices are prevalent in the second and third domains, respectively. The expression of the POTE gene is limited to normal reproductive tissues and is also observed in several types of malignancies. Although the biological purpose of the POTE genes is unknown, their high expression is

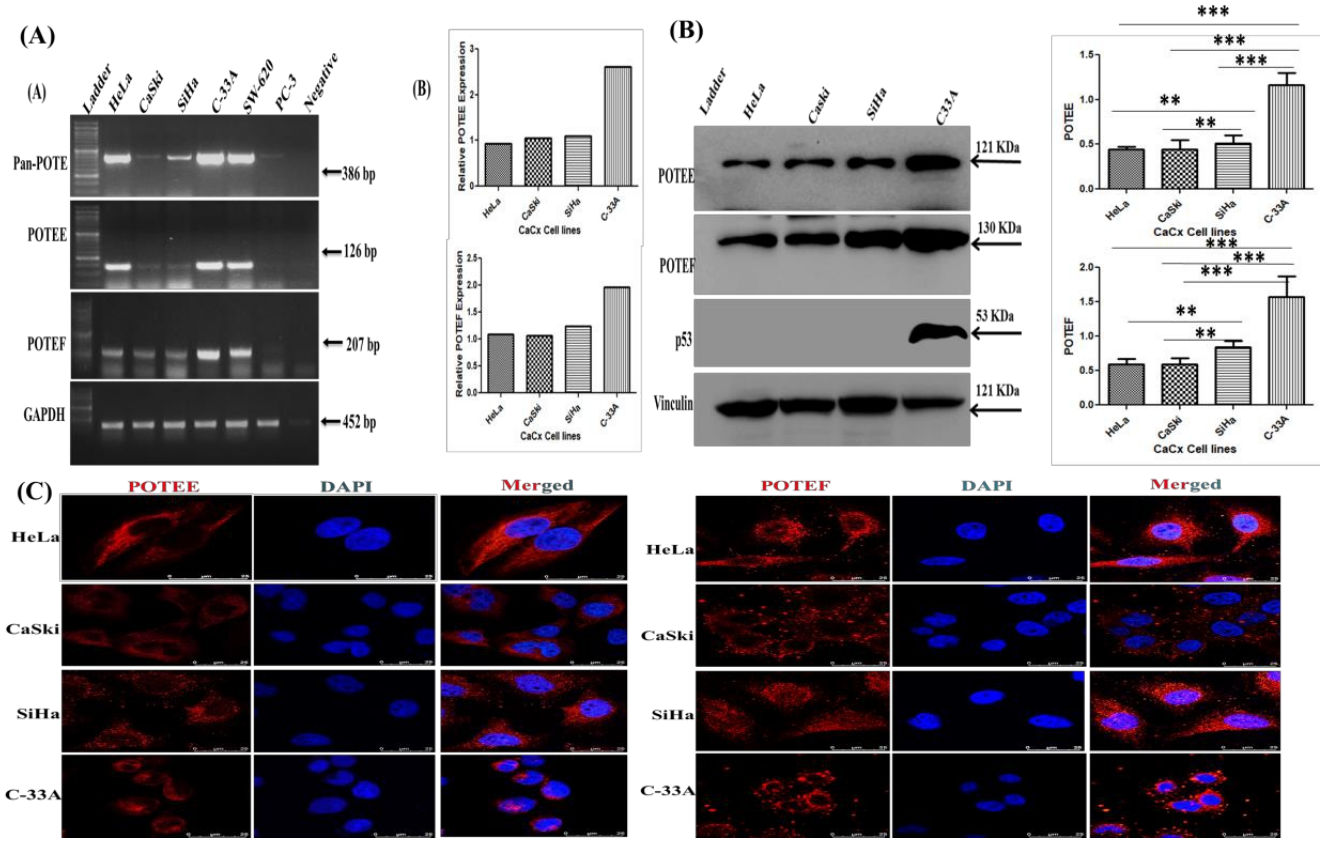

Figure 1: Up-regulated expression of POTE paralogs in CaCx cell lines: [A] RT-PCR analysis on HPV positive and HPV negative CaCx cell lines for Pan-POTE, POTEE & POTEF transcripts; which showed the amplified products of 386 bp, 126 bp & 207 bp respectively. Further Real Time data validate the RT-PCR data. **[B]** Western Blotting result showed the expression of POTEE, POTEF and p53, where the signals were observed at 121 kDa, 130 kDa & 53 kDa respectively. The band intensity was measured through Image J and graph was prepared through GraphPad-prism. Results are shown as mean ± SEM (*n* = 3) and one way Anova test was used to compared the data. **[C]** Immunofluorescence staining of different CaCx cell lines and cytoplasmic expression of POTEE & POTEF expression depicted in red color. DAPI was used to stain the nucleus. All images captured at 63X with immersion oil through Leica Confocal microscopy.

reported in primary spermatocytes; particularly the ones, which are going through apoptosis. Function of POTE-paralogs in human cancer was studied using Hela cells as a model, where POTE-2α-actin (POTEF) was found to be up-regulated. Therefore, in the present study; POTEE & POTEF expression were analysed in the E6/E7 (onco-protein of HPV-16) knockdown CaSki cells. The obtained results suggested that the expression of POTEE & POTEF up-regulated along with p53 and pRB, after the silencing of E6/E7 of HPV-16.

Expression of POTE Paralogs in CaCx cell lines

Expression of POTE-paralogs, including POTEE & POTEF were confirmed in HPV positive as well as HPV negative CaCx cell lines, where SW-620 (Colorectal cancer cell line) was considered as positive control and PC-3 (Prostate cancer cell line) was used as a negative control (Figure 1A). HPV-positive CaCx cell lines (HeLa, CaSki & SiHa) showed much lower expression of POTE-paralogs as compared to HPV-negative CaCx (C-33A) cell line at the transcriptional as well as translational level. Western data also further confirmed that p53 positive and HPV negative cell line C-33A exhibit considerably higher expression of POTEE & POTEF (Figure 1A & B). Immunofluorescence analysis established the cytosolic expression of both POTEE & POTEF (Figure 1C). Therefore, obtained results suggested that expression of POTE-paralogs might depend on the expression of HPV's oncogenes. Vice-versa, knockdown of HPV-16 oncogenes E6/E7 was performed in the CaSki cell lines to assess the expression dependence of POTE-paralogs on HPV-16 oncogene expression.

Silencing of HPV-16 Oncogenes E6/E7 Upregulated the Expression of POTE-Paralogs in CaSki Cells

Fluorescent microscopy and Flow Cytometry analysis was done to assess the transduction efficiency of lenti-shRNA particles in the CaSki cells. Intense green fluorescence was observed through

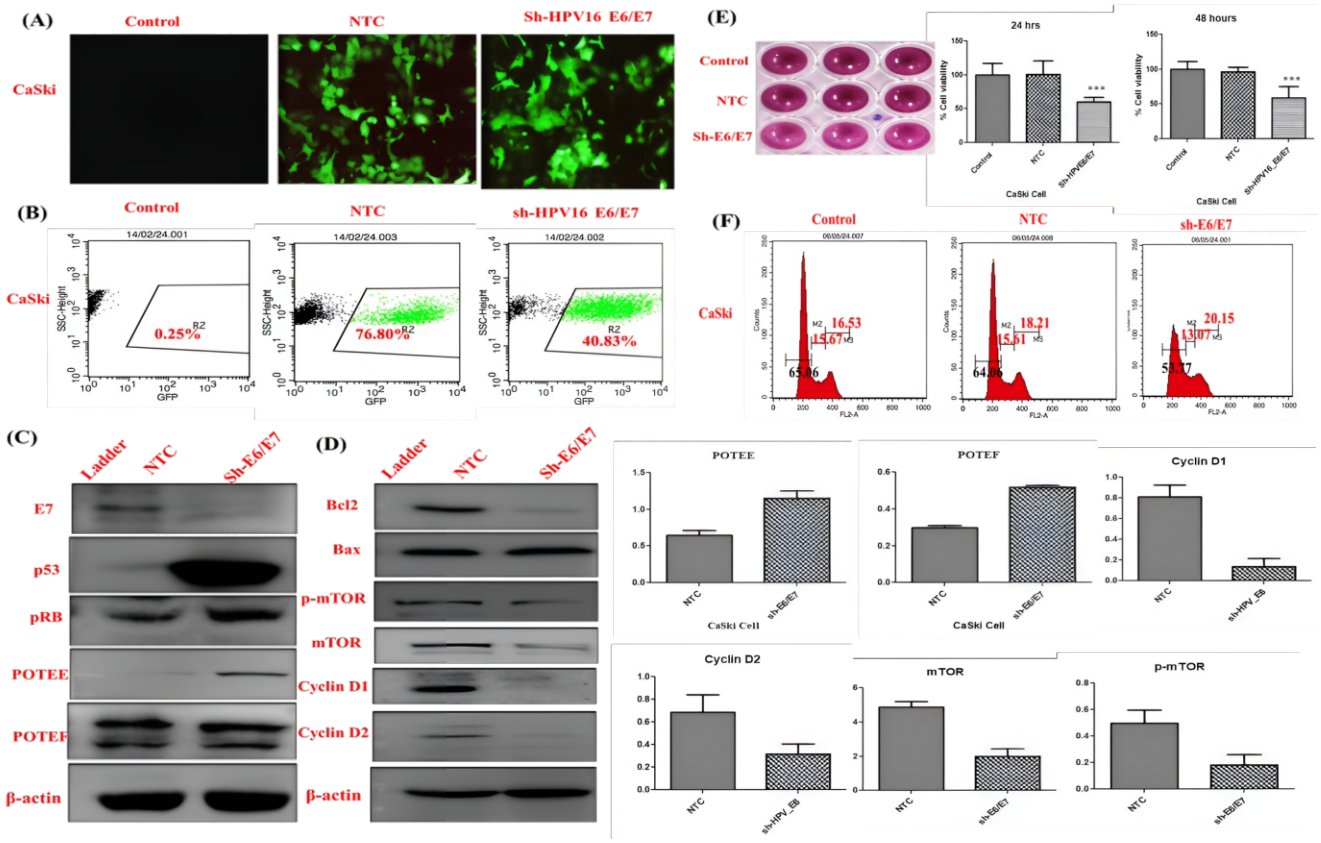

Figure 2: Impact of HPV-16 oncogene E6/E7 silencing on the expression of POTE paralogs in CaSki Cells: (A) GFP expression was checked in lentiviral particle containing sh-RNA against E6/E7 of HPV16 through Microscopy analysis. **(B)** FACS analysis confirm the transduction efficiency in the cells containing the sh-RNA against E6/E7 of HPV16. **(C)** Knockdown of E6/E7 was confimed through western blotting by checking the expression of E7 as well as p53 & pRB. **(D)** Anti-proliferative and apoptotic marker analysed in the NTC (Non-target Control) and E6/E7 knockdown cells. **(E)** Effect of E6/E7 silencing on proliferation, checked through MTT assay. **(F)** MTT results were validated through cell cycle analysis and found to be arrested in G1/S phase.

microscopy that clearly demonstrated the expression of GFP (Figure 2A). Flow cytometer was used to examine the GFP signals in order to determine the precise proportion of GFP-expressing cells or percent transduction (Figure 2B). As the two onco-proteins E6/E7 of HPV play a crucial role in tumorigenesis. Hence the knockdown of HPV-16 oncogenes E6/E7 was confirmed through the western blotting done with its specific antibody as well as through the restoration of p53 & pRB. Expression of POTEE & POTEF was found to be upregulated after the knockdown of HPV-16 oncogenes E6/E7 in CaSki cells (Figure 2C). As per the previous reports; Apoptotic and proliferative markers were also analysed to confirm the impact of HPV16 E6/E7 knockdown (Figure 2C&D). To investigate the under lying mechanism by which sh-E6/E7 expression promotes tumorigenesis; MTT assay and Cell cycle analysis were performed after the knockdown of E6/E7 oncogenes. MTT assay data suggested that cell proliferation was downregulated gradually within 24 & 48 hrs (Figure 2E). In Cell cycle analysis, cells were stained with PI and analysed through flow cytometry to assess the effect on the different phases of cell cycle. It is evident from the results that sh-E6/E7 silencing actually stopped the partial accumulation of cells in the S-phase of the cell cycle (Figure 2F). Downregulated expression of CyclinD1 & CyclinD2 through western blotting data also validated the results of cell cycle analysis. Overall, these results suggest that silencing of sh-E6/E7 might inhibit the cellular proliferation by arresting the cell cycle of S-phase in HPV-16 positive CaSki cells.

As our results demonstrated that POTEE & POTEF expression up-regulated along with p53 & pRB expression; after the knockdown of HPV-16 oncogene E6/E7; hence, POTE-paralogs can be targeted for synergistic therapeutic purposes. Its unique over-expression in cancer-specific abnormal somatic cells also makes it a crucial target for cancer immunotherapy. Overall, the relative expression levels of POTE-paralogs can be explored further for the early diagnosis as well as therapeutic purposes of CaCx.

6 Metabolic Disorders

Vision :

Cutting edge research and affordable healthcare for metabolic diseases including cardiovascular, hepatic, gut, pulmonary and inflammatory diseases

Goals :

- Identification of small molecules and/or Phyto-pharmaceuticals for diseases such as NAFLD, cardiovascular, hepatic, gut, pulmonary and inflammatory diseases
- Clinic oriented research- Research collaboration and joint grant submissions with clinicians on cardio-metabolic disorders
- Identification of NCEs for hepatic, pulmonary and cardiac fibrosis Identifying novel targets for heart failure drug development with emphasis on RNA binding proteins
- Target-based screening and establishment of fibroblast migration assays for immuno-modulatory Disorders
- Identification of novel targets of cardiac hypertrophy with focus on metabolism
- Identification of gut microbiome modulators and studying the correlation of gut microbiome with cardiovascular and metabolic disorders
- Elucidating the immunological and inflammatory mechanisms of metabolic disorders

Front Row (L to R): Dr. Ajay Kumar Srivastava, Dr. K. V. Sashidhara, Dr. Manoj Kumar Barthwal, Dr. Kashif Hanif, Dr. Akhilesh Kumar Tamrakar

Second Row (L to R): Dr. Sachin Kumar, Dr. Shashi Kumar Gupta, Dr. Baisakhi Mohrana, Dr. Anil N Gaikwad, Dr. Kumaravelu Jagavelu

- Dr. Manoj K. Barthwal
Chief Scientist &
Area Coordinator

6.1 Fundamental Research

6.1.1 Interleukin-1 Receptor Associated Kinase Mediates Angiotensin II Induced Cardiac Hypertrophy by Regulating NF-κB and TGF-β Pathway

Pathological cardiac hypertrophy is a feature of various Cardiovascular Disorder. Left Ventricle (LV) hypertrophy in hypertensive population is estimated to be around 20-50% of different studies. Activation of Angiotensin II (Ang II) promotes cardiomyocyte hypertrophy, inflammation and fibrosis, which plays crucial role in cardiac remodeling. Present study was undertaken to study role of Interleukin-1 receptor-associated kinases (IRAK) and the underlying mechanisms in Ang II induced cardiac hypertrophy and fibrosis. Male C57BL/6J mice were infused with saline (sham) or Ang II using osmotic minipumps (1.5mg/kg/day, subcutaneously for 4 weeks). IRAK-1/4 inhibitor (2.21 mg/kg, intra-peritoneal, thrice a week) was administered from the day of pump implantation. Animals were subjected to ultrasound imaging and Blood Pressure measurements. Cardiac hypertrophy, inflammation, fibrosis was examined by histopathology and immunofluorescence. mRNA and protein expressions of various markers was assessed by qRT-PCR and Western blotting in LV tissue. Ang II infusion leads to significant alterations in cardiac function as evident by decrease in ejection fraction and fraction shortening and an increase in the systolic blood pressure, heart weight to tibia length ratio when compared to saline infused animals. An increase in the inflammatory cell burden and collagen deposition was also observed indicating activation of inflammatory and fibrotic pathways. Pre-treatment with IRAK-1/4 inhibitor, prevented Ang II induced cardiac inflammation, fibrosis, hypertrophy and dysfunction. Ang II induced degradation of IκB and induced TGF-β protein expression indicating role of NFκB and TGF-β in the disease phenomenon. IRAK 1,4 treatment prevented IκB degradation and TGF-β expression, suggesting their role in IRAK-mediated cardiac inflammation and fibrosis. Therefore, from the present study it can be concluded that IRAK regulates cardiac inflammation and fibrosis by modulating NF-κB and TGF-β pathway respectively.

6.1.2 Role of Metabolic Reprogramming in Vascular Smooth Muscle Cell Calcification

Pyruvate kinase is a terminal step enzyme of glycolysis that catalyzes the transfer of phosphoryl groups from phosphoenolpyruvate to ADP, generating pyruvate and ATP. The present study investigates the role of PKM2 in VSMC calcification. Primary mice VSMC were treated with calcification media and PKM2 activator, DASA-58 (50 μM) and PKM2 small molecular inhibitor, Shikonin (1μM). Calcium deposition was observed by Alizarin Red staining and calcium content was estimated by o-cresolpthalein complex one method. Phenotypic switching was assessed by RT-qPCR of osteogenic markers such as Msx2, BMP2. OCR and ECAR was performed to assess metabolic reprogramming induced by PKM2 activation. Protein expression was checked by western blotting. PKM2 activator, DASA-58 treated VSMC exhibited increased calcium deposition and calcium content while Shikonin attenuated the VSMC calcification. In addition to this, there was upregulation of osteogenic markers, Msx2 and BMP2 in the DASA-58 treated VSMC which was attenuated with the treatment of Shikonin. Seahorse analysis showed metabolic reprogramming which was confirmed by the RT-qPCR of glycolytic and oxidative phosphorylation genes. DASA-58 treatment elevated BMP2 protein expression, a gene involved in osteogenic transformation and calcification. PKM2 activator, DASA-58 exacerbates VSMC calcification by promoting phenotypic switching and metabolic reprogramming through BMP2.

6.1.3 *Polyalthia longifolia*-Sourced Phytopharmaceutical Shows Promise Against Dyslipidemia: Investigating its Action *via* Co-inverse miRNA-mRNA Expression

Obesity and metabolic disorders pose significant global health challenges, necessitating novel therapies. This study investigates the anti-adipogenic and anti-dyslipidemic properties of 4655-EF, a phytopharmaceutical derived from *Polyalthia longifolia*, and its underlying molecular mechanisms. The bioactivity-guided supercritical fluid extraction method used for its preparation supports large-scale production. RP-UHPLC analysis of 4655-EF identified four biomarkers with compositions of 21.19 ± 1.21% (N-016-0014), 0.83 ± 0.02% (N-016-0015), 0.3 ± 0.02% (N-016-0016), and 35.09 ± 1.57% (N-016-0017). The effects of 4655-EF were assessed in HFD-fed Syrian Golden Hamsters and C57BL/6 mice, models of dyslipidemia and obesity, respectively. Treatment reduced body weight, fat mass, and lipid levels in both models while improving glucose tolerance and insulin sensitivity in mice. Mechanistic studies revealed that 4655-EF downregulated genes associated with adipogenesis, cholesterol metabolism, and PPAR signaling pathways, as identified through next-generation sequencing. miRNA expression analysis further indicated activation of the anti-adipogenic Wnt/β-catenin pathway. These findings suggest that 4655-EF exerts beneficial effects through multiple mechanisms and holds promise as a scalable phytopharmaceutical for treating obesity and dyslipidemia.

6.1.4 ER Stress Aggravates NOD1-Mediated Inflammatory Response Leading to Impaired Nutrient Metabolism in Hepatoma Cells

Nucleotide-binding Oligomerization Domain 1 (NOD1) is a cytosolic pattern recognition receptor that senses specific bacterial peptidoglycan moieties, leading to the induction of inflammatory response. Besides, sensing peptidoglycan, NOD1 has been reported to sense metabolic disturbances including the ER stress-induced unfolded protein response (UPR). However, the underpinning crosstalk between the NOD1 activating microbial ligands and the metabolic cues to alter metabolic response is not yet comprehensively defined. Here, we show that underlying ER stress aggravated peptidoglycan-induced NOD1-mediated inflammatory response in hepatoma cells. The

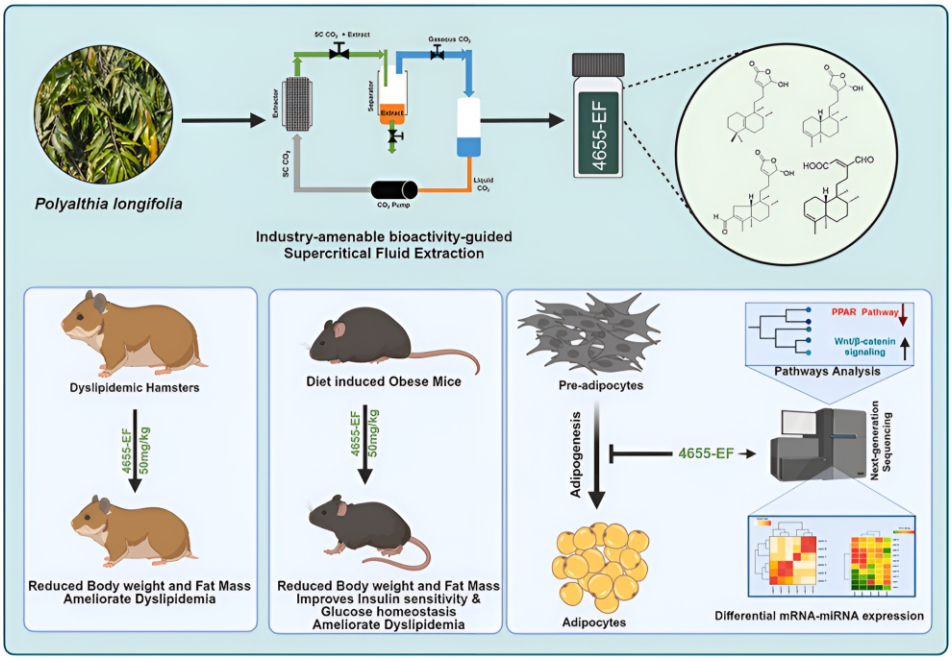

Figure 1: Effect of *Polyalthia longifolia* against dyslipidemia

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HepG2 cells, undergoing ER stress induced by thapsigargin, exhibited an amplified inflammatory response induced by the peptidoglycan ligand of NOD1 (i.e. iE-DAP). This aggravated inflammatory response disrupted lipid and glucose metabolism, characterized by *de novo* lipogenic response, and increased gluconeogenesis in HepG2 cells. Further, we characterized that the aggravation of NOD1-induced inflammatory response was dependent on inositol-requiring enzyme 1 α (IRE1α) and protein kinase R (PKR)-like endoplasmic reticulum kinase (PERK) activation, in conjunction with calcium flux. Altogether, our findings suggest that differential UPR activation makes liver cells more sensitive towards bacterial-derived ligands to pronounce inflammatory response in a NOD1-dependent manner that impairs hepatic nutrient metabolism (**Biochem Biophys Res Commun. 2024; 735: 150827**).

6.1.5 Effect of Diminazene Aceturate, an ACE2 Activator, on Platelet CD40L Signalling Induced Glial Activation in Rat Model of Hypertension

Hypertension causes platelet activation and adhesion in the brain resulting in glial activation and neuroinflammation. Further, activation of Angiotensin-Converting Enzyme 2/Angiotensin (1-7)/Mas Receptor (ACE2/Ang (1-7)/MasR) axis of central Renin-Angiotensin System (RAS), is known to reduce glial activation and neuroinflammation, thereby exhibiting anti-hypertensive and anti-neuroinflammatory properties. Therefore, in the present study, the role of ACE2/Ang (1-7)/MasR axis was studied on platelet-induced glial activation and neuroinflammation using Diminazene Aceturate (DIZE), an ACE2 activator, in astrocytes and microglial cells as well as in rat model of hypertension. We found that the ACE2 activator DIZE, independently of its BP-lowering properties, efficiently prevented hypertension-induced glial activation, neuroinflammation, and platelet CD40-CD40L signaling via upregulation of ACE2/Ang (1-7)/MasR axis. Further, DIZE decreased platelet deposition in the brain by reducing the expression of adhesion molecules on the brain endothelium. Activation of ACE2 also reduced hypertension-induced endothelial dysfunction by increasing eNOS bioavailability. Interestingly, platelets isolated from hypertensive rats or activated with ADP had significantly increased sCD40L levels and induced significantly more glial activation than platelets from DIZE treated

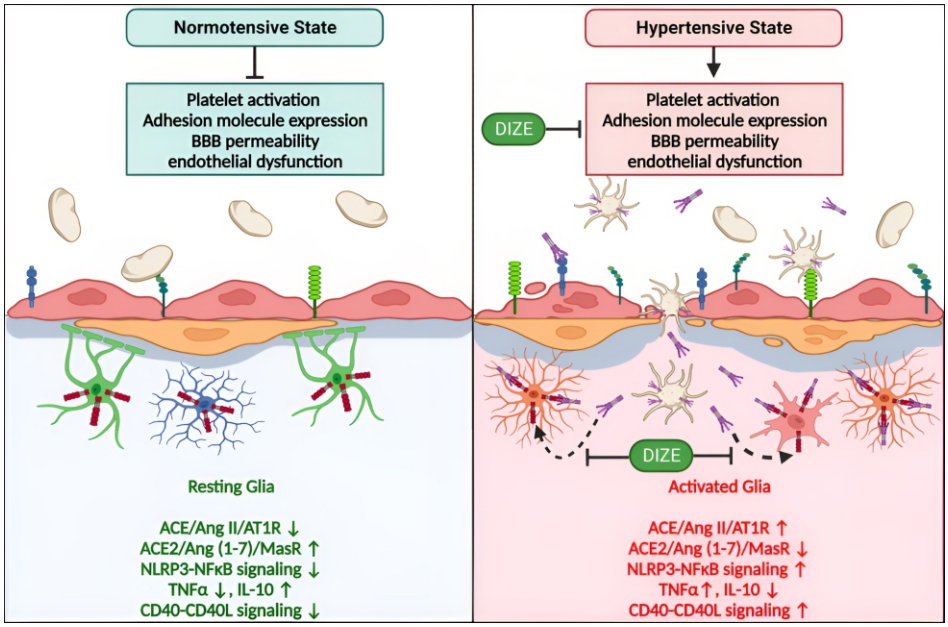

Figure 2: Effect of Angiotensin converting enzyme 2 on platelet induced glial activation

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group. Therefore, injection of DIZE pre-treated ADP-activated platelets into normotensive rats strongly reduced glial activation compared to ADP-treated platelets. Moreover, CD40L-induced glial activation, CD40 expression, and NFκB-NLRP3 inflammatory signaling are reversed by DIZE. Furthermore, the beneficial effects of ACE2 activation, DIZE was found to be significantly blocked by MLN4760 (ACE2 inhibitor) as well as A779 (MasR antagonist) treatments. Hence, our study demonstrated that ACE2 activation reduced the platelet CD40-CD40L induced glial activation and neuroinflammation, hence imparted neuroprotection. (**Int Immunopharmacol. 2024 Sep 30:139:112654. doi: 10.1016/j.intimp.2024.112654**)

6.1.6 Understanding the Role of Peroxisomes during Bacterial Infection

Typhimurium (*Salmonella*) resides and multiplies intracellularly in cholesterol-rich compartments called *Salmonella*-containing vacuoles (SCVs) with actin-rich tubular extensions known as *Salmonella*-induced filaments (SIFs). SCV maturation depends on host-derived cholesterol, but the transport mechanism of low-density lipoprotein (LDL)-derived cholesterol to SCVs remains unclear. Here we find that peroxisomes are recruited to SCVs and function as pro-bacterial organelle. The *Salmonella* effector protein SseI is required for the interaction between peroxisomes and the SCV. SseI contains a variant of the PTS1 peroxisome-targeting sequence, GKM, localizes to the peroxisomes and activates the host Ras GTPase, ADP-ribosylation factor-1 (ARF-1). Activation of ARF-1 leads to the recruitment of phosphatidylinsolitol-5-phosphate-4 kinase and the generation of phosphatidylinsolitol-4-5-bisphosphate on peroxisomes. This enhances the interaction of peroxisomes with lysosomes and allows for the transfer of lysosomal cholesterol to SCVs using peroxisomes as a bridge. *Salmonella* infection of peroxisome-depleted cells leads to the depletion of cholesterol on the SCVs, resulting in reduced SIF formation and bacterial proliferation. Taken together, our work identified peroxisomes as a target of *Salmonella* secretory effectors, and as conveyance of host cholesterol to enhance SCV stability, SIF integrity, and intracellular bacterial growth.

- Salmonella effector SseI recruits peroxisomes to serve as a bridge for the transport of lysosomal cholesterol to the SCV.
- SseI is targeted to peroxisomes via a PTS1-like motif.
- SseI activates ARF-1 resulting in the activation of PI5P4K (PIP4K) and PIP2 generation on peroxisomes.
- PIP2 strengthens the interaction of peroxisomes with SCVs using Syt7 as the tethering protein on SCVs.
- Peroxisomes serve as bridge for the transport of cholesterol from lysosomes to the SCV.

6.1.7 TWEAK Exerts Cardiac Fibrosis through Exosome Shuttling of microRNA-7

Cardiac hypertrophy and fibrosis are major contributors to the progression of heart failure. Cardiac fibrosis, defined as the excessive proliferation and differentiation of cardiac fibroblasts, is a hallmark of pressure overload-induced heart failure. Tumour necrosis factor-like weak inducer of apoptosis (TWEAK), acting through its receptor Fn14, is emerging as a central mediator of pathological cardiac remodelling. Further, to delve more into the mechanisms linking cardiomyocyte hypertrophy to fibrosis, with a particular

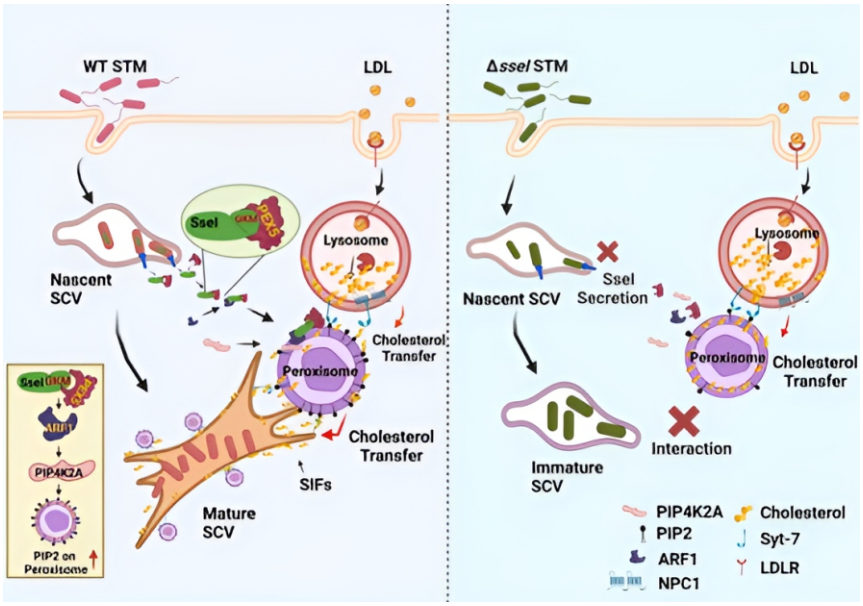


Figure 3: Salmonella effector SseI recruits peroxisomes to serve as bridge for the transport of lysosomal cholesterol to the SCV.

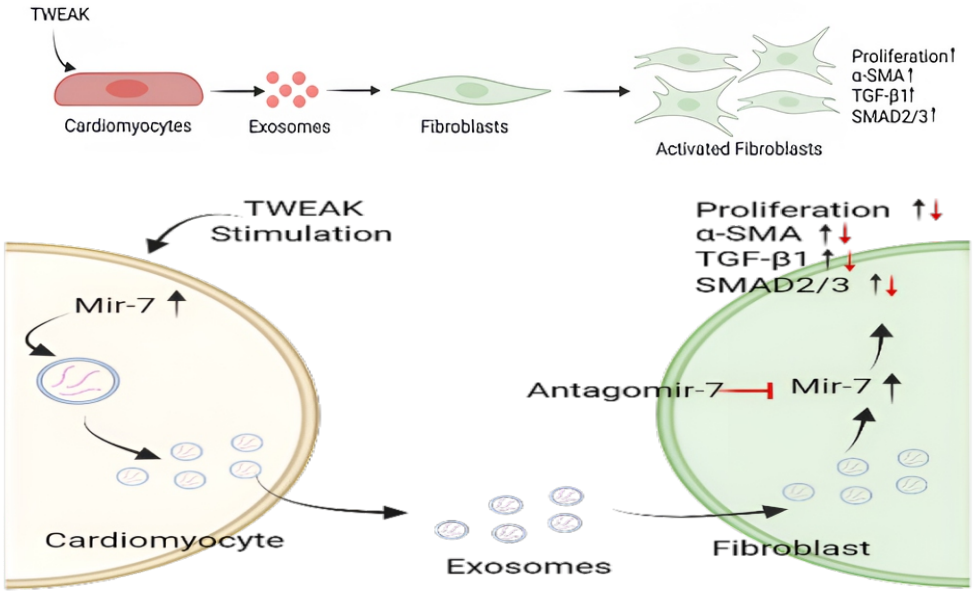


Figure 4: Effect of Tumour necrosis factor-like weak inducer of apoptosis (TWEAK) on cardiomyocytes.

emphasis on the role of TWEAK in paracrine signalling, primary rat cardiomyocytes were stimulated with recombinant TWEAK (200 ng/ml), and exosomes were isolated and characterized. DIL-labeled exosomes were incubated with cardiac fibroblasts (CFs) to assess uptake and fibrotic responses. *In vivo*, rats were subjected to transverse aortic constriction (TAC) to induce hypertrophy and fibrosis and treated with ATA. Further, Exosomes derived from TWEAK-stimulated cardiomyocytes were administered to SD rats (10 µg, i.v. every other day for 4 weeks). Exosomal uptake, miR-7 expression, fibrosis markers, and metabolic alterations were evaluated. Functional assays, including qRT-PCR, western blotting, and scratch assays, were performed. TWEAK stimulation induced miR-7-enriched exosomes in cardiomyocytes, which were internalized by fibroblasts, triggering α-SMA, TGF-β1, and SMAD2 activation. ATA reversed these effects by suppressing TWEAK, miR-7, and fibrotic remodeling. *In vivo* administration of exosomes in rats led to increased cardiac fibrosis, collagen deposition, and fibrotic gene expression. This study establishes the TWEAK/Fn14 pathway as a critical driver of cardiac hypertrophy and fibrosis through both direct signaling and miR-7-rich exosome-mediated paracrine effects. *In vivo*, delivery of TWEAK-induced exosomes confirmed their potent fibrotic influence while targeting the TWEAK/miR-7 axis represents a promising therapeutic strategy for preventing or reversing heart failure progression.

6.1.8 Neutrophil Biology

Neutrophils, the most abundant leukocytes, are pivotal immune system components in pathophysiological contexts. They combat invading pathogens through mechanisms including phagocytosis, oxidative burst, and the formation of neutrophil extracellular traps (NETs). Furthermore, neutrophils play a crucial role in intercellular communication within the immune system by secreting cytokines and chemokines to coordinate with other immune cells. Despite their beneficial roles, armed with proteases and oxidants, neutrophils can also inadvertently cause tissue damage and are implicated in various pathological conditions such as sepsis, systemic lupus erythematosus (SLE), rheumatoid arthritis (RA), and systemic vasculitis. The neutrophil-lymphocyte ratio (NLR) serves as a common indicator of disease severity. However, caution is warranted in targeting neutrophil populations despite their involvement in disease pathology, as their deficiency can lead to immunodeficiency and recurrent infections. Recent research has shed light on neutrophil populations with diverse functions, ranging from pro-inflammatory to immunosuppressive, under pathological conditions. Nevertheless, our understanding of neutrophil subtypes remains limited, especially in inflammation and disease. Therefore, identifying novel neutrophil subsets and elucidating their roles in inflammatory conditions is imperative. Targeting specific neutrophil subsets holds promise in providing tailored treatments for pathologies characterized by distinct neutrophil phenotypes, such as those with inflammatory or immunosuppressive features. In one of key finding, we identified Sca1 expressing novel neutrophil subset. Moreover, we unveiled and characterized an inflammatory subset, Sca-1pos neutrophils, under both steady-state and disease conditions (**bioRxiv, 2024.09. 16.613221**).

Other studies in the lab are focused towards neutrophil training and their clearance. We are also targeting neutrophil extracellular traps associated with various disease via identification of small molecule inhibitors. These finding will provide better

understanding of these neutrophil participation in immunity and inflammation.

6.1.9 RNA-Binding Protein Quaking Regulates Cardiac Cachexia

Lower levels of *Qki* were reported in human and mouse-failing hearts, implicating its involvement in cardiac diseases. However, the molecular and functional effects of its downregulation in adult myocardium remain largely unknown. We have found that AAV9-mediated knockdown of *Qki* by shRNAs in the hearts of adult BALB/c mice led to cardiac malfunction, atrophy, apoptosis, heart failure, and death within two weeks. Ultrastructure assessments by transmission electron microscopy confirmed the myofibre and mitochondrial damage upon *Qki* knockdown. Global transcriptomic analysis of *Qki* knockdown hearts revealed significant dysregulation of 996 alternative splicing events upon *Qki* knockdown. Mechanistically, we discovered that loss of *Qki* promotes the exclusion of the third exon of *Morf4l2,* leading to higher expression of exon three excluded variant (*Morf4l2Δex3*). Like rodents, the RNA-seq dataset from 108 human hearts revealed a lower splice junction count of *MORF4L2* exon three in hearts with low levels of *QKI* compared to subjects with higher *QKI* levels. Specific knockdown of *Morf4l2Δex3* rescues *Qki* knockdown-induced cardiac cachexia and improves cardiac function. Moreover, *Morf4l2Δex3* was increased in the colon cancer-induced cardiac cachexia mouse model, and its inhibition prevented cardiac cachexia and improved cardiac function. Mechanistically, exon three of *Morf4l2* lies in the 5'UTR, and its exclusion leads to higher expression of MORF4L2 upon *Qki* knockdown due to the lack of a G2-quadruplex. Collectively, *Qki* knockdown in the adult heart leads to cardiac cachexia due to the alteration of *Morf4l2* splicing. Inhibition of *Morf4l2Δex3* inhibits cancer-induced cardiac cachexia, demonstrating it as a potential therapeutic target. (Unpublished Data)

6.2 Biological Screening

Overall discovery efforts in the area of metabolic diseases involves screening the compounds, establishing new *in vitro* and *in vivo* models, setting up new target based screening and understanding the disease mechanism. The discovery efforts included work in the area of adipogenesis, inflammation and beta-3 adrenergic receptors screening. Efforts included establishment of new models of vascular calcification and non-alcoholic fatty liver disease (NAFLD). A new protease target for NAFLD caseinolytic protease P (CLpP) is being established. Besides this a new model involving pulmonary artery banding for inducing right ventricular hypertrophy in Rat is being established that will mimic the COPD associated cardiac dysfunction. Scientists are also engaged in standardizing new ways of establishing mitochondrial health. Brief outline of screening efforts is listed below.

6.2.1 Anti-adipogenic screening:

Submitted molecule	Activity checked	Active	Hit molecule
27	27	1	S-024-0794
75	36	Inactive	

6.2.2 β-3 Adrenergic Receptor Screening:

Submitted molecule	Activity checked	Active	Hit molecule
16	16	Inactive	
1	1	Active	S-024-0794

6.2.3 Anti-Inflammatory Screening:

During the reporting period, a total of 45 compounds (S024-0397)- (S024-0440), (S024-0640)- (S024-0659), (S024-0492)-(S024-0511) were submitted through CBRS and screened for their anti-inflammatory activity. It was done by evaluating LPS-induced TNF-α production in THP-1 human monocytes and thereby evaluating inhibitory potential of test items in the same assay. THP-1 human monocytic cells were treated with vehicle or test compound at concentration of 10 µM, and subsequently TNF- α level were evaluated via ELISA based method. % inhibition >80% were considered active, and none of the compounds tested were inhibiting LPS-induced TNF-α production in THP-1 human monocytes in a significant manner.

7 Musculoskeletal Health and Disorders

Vision :

To undertake pioneering research in diseases of bone and muscle for discovering and developing affordable medicines

Goals :

- We focus on understanding metabolic bone diseases and muscle atrophy and address unmet clinical needs through discovery and development of the therapeutic candidates for these diseases
- Mechanism of pathobiology of musculoskeletal diseases
- Discovery of NCEs, NBEs and phyto-pharmaceuticals and repurposing of drugs for skeletal muscle atrophy and osteoporosis
- Discovery of RNA therapeutics towards precision medicine
- Targeting cellular senescence for mitigating age-related bone and muscle loss
- Biomarker discovery for clinical diagnosis of Osteoporosis
- Collaborative research with leading clinical experts and Indian industry
- Training future drug researchers

Front Row (L to R): Dr. Sabyasachi Sanyal, Dr. Atul Goel, Dr. Prabhat Ranjan Mishra, Dr. Naibedya Chattopadhyay, Dr. Ritu Trivedi, Dr. Divya Singh, Dr. Arun Kumar Trivedi

Second Row (L to R): Dr. Satish Chandra Philkhana, Dr. Pintu Kumar Mandal, Dr. Durga Prasad Mishra, Dr. Mohammad Imran Siddiqi, Dr. Kishor Mohanan, Dr. Sanjeev Kanojiya, Dr. Kinshuk Raj Srivastava

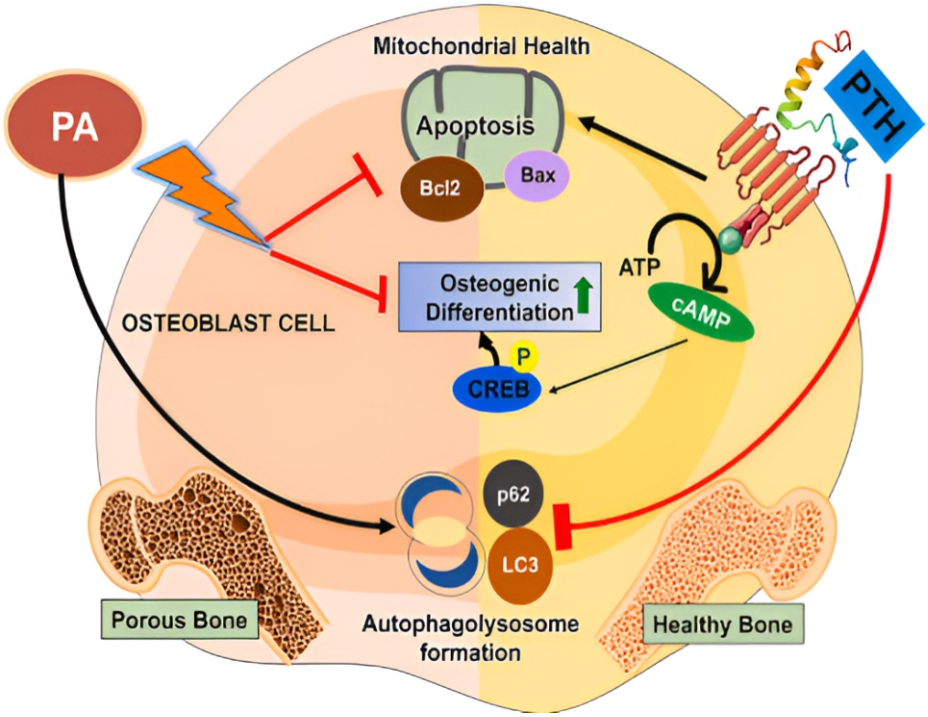
7.1 Screening

In the reporting period, ~250 synthetic and natural compounds were screened including the plant extracts. More than 30 compounds were active in ALP assay. Of the many S-023-0047 was evaluated further. The compound exhibited an EC_{50} of 1.64 X 10^{-10}M. The compound significantly induced bone matrix mineralization and upregulated key osteogenic markers. The PK studies of the compound are planned in order to determine the efficacy in established animal models. Other key achievement included the studies on Bergenin derivative N-021-022 which is being carried forward in form of a publication.

7.2 R&D Progress

7.2.1. FDA-Approved Polypeptide PTH 1–34 Impedes Palmitic Acid-Mediated Osteoblasts Dysfunction by Promoting its Differentiation and thereby Improving Skeletal Health

Excessive consumption of saturated fatty acids creates a debilitating cellular environment that hinders the normal function and survival of osteoblasts, contributing to bone metabolic disorders such as osteoporosis. The FDA-approved polypeptide PTH 1-34 is a well-established therapy for post-menopausal osteoporosis, yet its protective effects in a palmitic acid (PA)-rich hyperlipidemic environment are not well understood. This study explores the protective effects of the FDA-approved polypeptide PTH 1-34 on osteoblasts exposed to a palmitic acid (PA)-rich hyperlipidemic environment. PA negatively impacts osteoblasts by inhibiting differentiation, increasing apoptosis, and disrupting autophagy, impairing bone health. However, PTH 1-34 counteracts these effects by modulating key signaling pathways (cAMP/CREB), restoring bone-anabolic gene expression, preserving mitochondrial function, and regulating autophagy. *In vivo* experiments in C57BL/6J mice confirmed these findings, demonstrating that PTH 1-34 maintains osteoblast function and number. This research highlights the potential of PTH 1-34 for treating lipid-induced skeletal dysfunctions, expanding its therapeutic applications beyond postmenopausal osteoporosis. ***(Molecular and Cellular Endocrinology2025(PMID: 39719245).***



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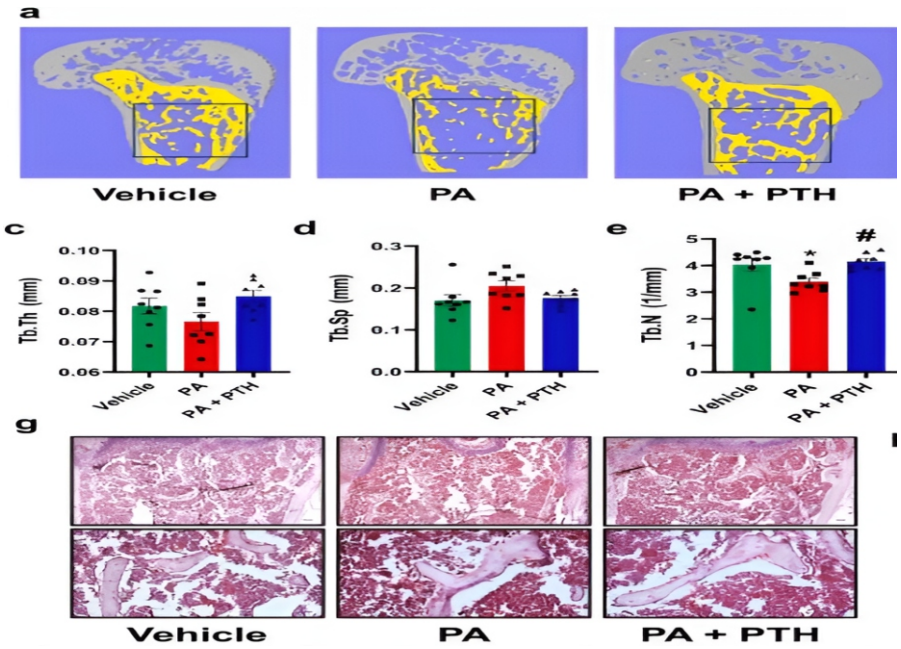
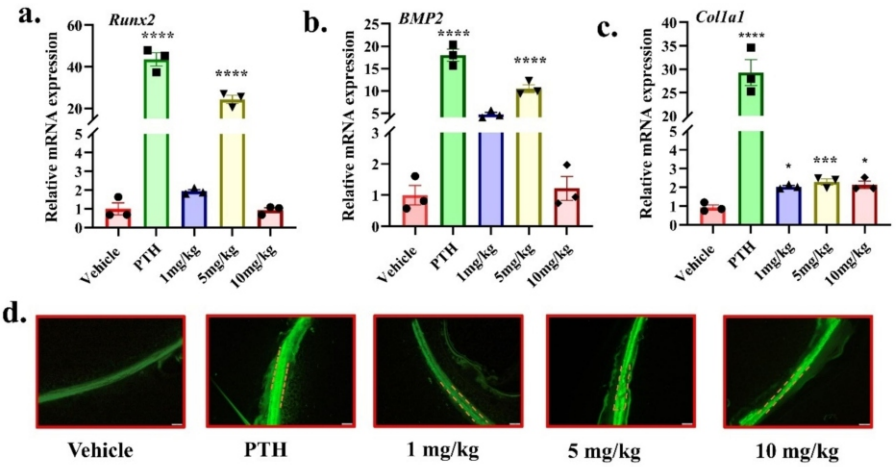


Figure: PTH 1-34 promoted bone growth by preventing excessive bone loss brought on by an increased PA load. An example 3D representation of the tibial metaphyseal region's bone microarchitecture derived from μCT analysis. Hematoxylin and eosin-stained bone slices under a

7.2.2. Design, Synthesis, and Biological Evaluation of a New Class of Pyrazoles-Dihydropyrimidinone Derivatives as Bone Anabolic Agents

The study investigated 24 newly synthesized pyrazole-dihydropyrimidinone hybrids as potential bone anabolic agents. An alkaline phosphatase assay identified three promising compounds (5f, 5u, and 5w), with 5w showing the strongest osteoanabolic effect by promoting osteoblast differentiation and upregulating osteogenic gene expression. Structure-activity relationship (SAR) analysis highlighted the importance of a furan ring and electron-donating groups for osteogenic activity. Molecular docking, pharmacokinetic profiling, and *in silico* ADME predictions suggest potential oral bioavailability. These findings establish pyrazole-dihydropyrimidinone derivatives as promising candidates for developing new bone anabolic therapies. (***Bioorganic Chemistry 2025, 157, 108216(PMID: 39952063)***



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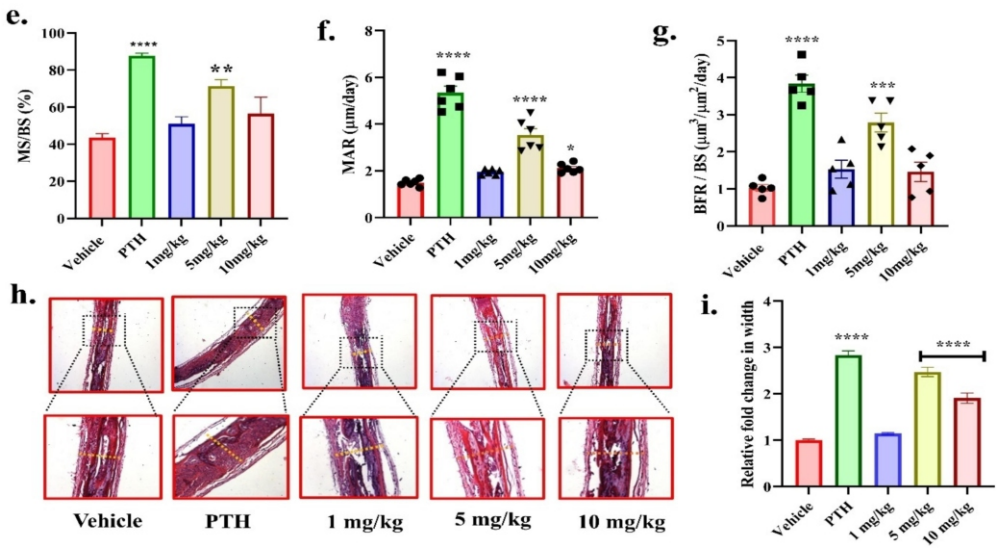


Figure: The osteogenic properties of compound 5w have been validated *in vivo*. When compared to the vehicle, the treatment group showed a significant increase in the expression of the osteogenic genes Runx2 (a), BMP2 (b), and Col1a1 (c). Double calcein pictures show the development of bone *in vivo* (d). Bone metrics MS/BS % (e), MAR (f), and BFR/BS (g) indicate that 5w can control bone formation in vivo. Significantly increased bone formation is revealed by HE staining, (h and i).

7.2.3. Comparative Assessment of Flavonoid Content of Banana Pulp and Peel and their Role in Mitigating Bone Loss Conditions and Promoting Osteoblast Differentiation

Banana fruit is widely grown and source of income across the tropics. It is known for its nutritional qualities and well-recognized medicinal applications. Given that banana pulp and peel are rich in high amount of flavonoids like naringenin, kaempferol, quercetin etc., which are known previously for their role in bone health, we hypothesize that banana pulp and peel can accelerate fracture healing, mitigate bone loss in post-menopausal condition and lead to osteoblast differentiation. This study investigates the bone anabolic effects of banana pulp and peel, both rich in flavonoids known for their role in bone health. A comparative analysis of flavonoid expression and their impact on fracture healing and osteoblast differentiation was done. In an osteotomy Balb/c mice model, oral administration of banana pulp (250–750 mg/kg/day) and peel (50–250 mg/kg/day) for two weeks improved bone microarchitecture. Micro-CT, calcein labelling, TRAP staining, and bone strength assessments confirmed that banana pulp enhanced bone formation while limiting resorption. These findings suggest that banana-derived flavonoids may aid in mitigating bone loss and promoting skeletal health. (***Food and function, 8, 2025***)

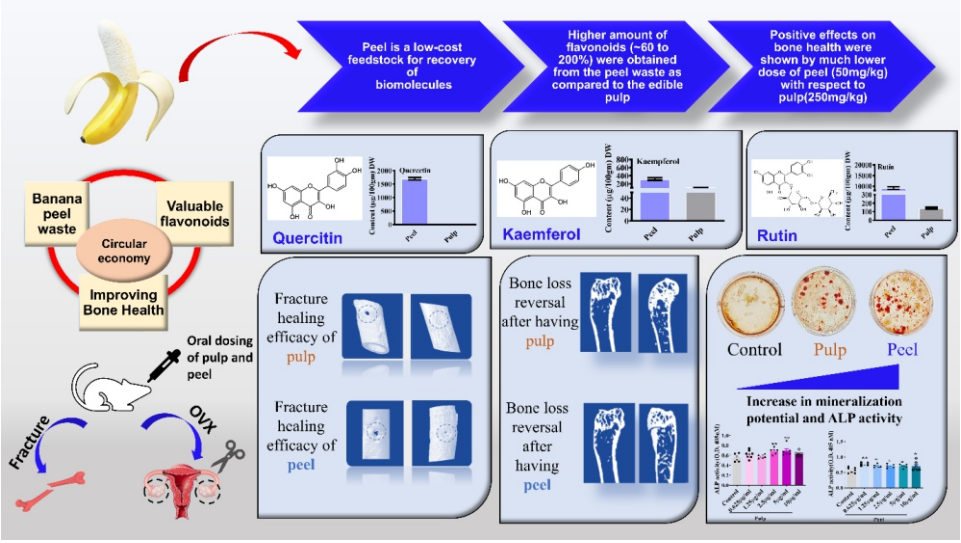


Figure: Banana pulp and peel and their role in mitigating bone loss conditions and promoting osteoblast differentiation

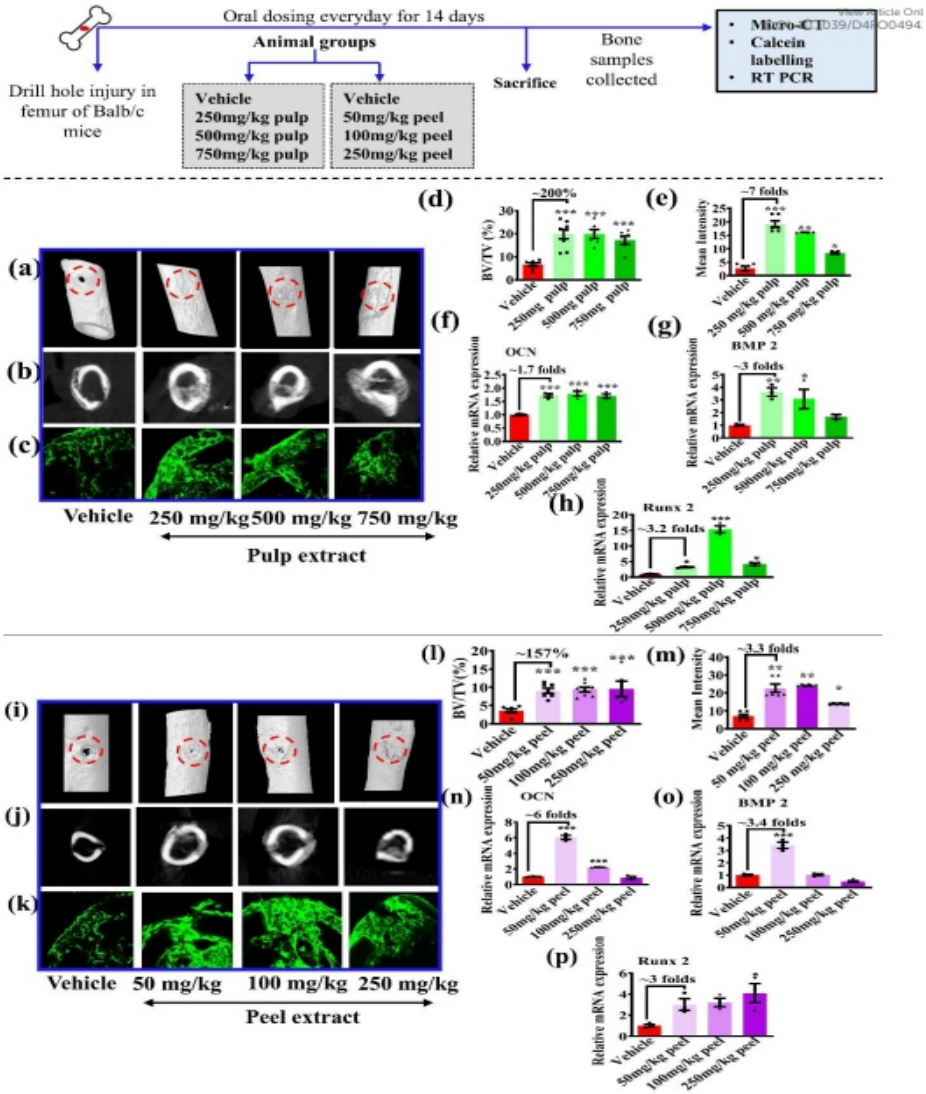


Figure: Banana pulp and peel improved fracture healing when animals were treated with 250mg/kg, 500mg/kg and 750mg/kg pulp and 50mg/kg, 100mg/kg and 250mg/kg peel for 2 weeks. Representative 3D images of the femur from micro-CT of fracture region in animals given pulp (a) and peel (i) through oral dosing. (b) and (j) show 2D images of the callus in pulp and peel groups respectively. Microscopic representation of calcein at fracture site in pulp (c) and peel group (k). Pulp group shows increased BV/TV % (bone volume/tissue volume ratio) at 250, 500 and 750 mg/kg (d) and peel extract show higher BV/TV% at lower doses like 50, 100 and 250mg/kg (l). Quantification of calcein labelling in callus region is depicted in (e) and (m) in animals that were given pulp and peel extract respectively). Pulp and peel promote callus formation by enhancing the expression of bone formation genes in fracture site. OCN mRNA levels in pulp and peel groups is shown in (f) and (n) respectively. BMP2 expression is elevated significantly at 250 and 500mg/kg pulp extract (g) and at 50mg/kg peel extract (o). Fold activity of Runx2 is represented in pulp extract (h) and peel (p) groups

7.2.4. Enrichment of the Major Bioavailable Molecule Glucuronated Flavone TMMG in *Spinacia oleracea* Ameliorates Cartilage Degeneration at a Lower Dose in ACLT-Induced Osteoarthritis

This study was evaluated the chondroprotective effects of *Spinacia oleracea* enriched extract (SOEE) containing TMMG, a bioactive flavone glucuronide, in an animal model of post-traumatic osteoarthritis. Rats underwent ACL transection (ACLT) and were treated with SOEE (10 or 20 mg/kg/day) or crude *Spinacia oleracea* extract (SOE, 125 mg/kg/day) for four weeks. Behavioral tests assessed locomotive function before study termination. SOEE at 10 mg/kg/day showed the strongest protective effect on cartilage, outperforming both the higher dose and crude SOE. Findings suggest a potential human equivalent dose of 1.522 mg/kg for osteoarthritis treatment, warranting further research. (***Food & Function 2025 {PMID: 39898820}***).

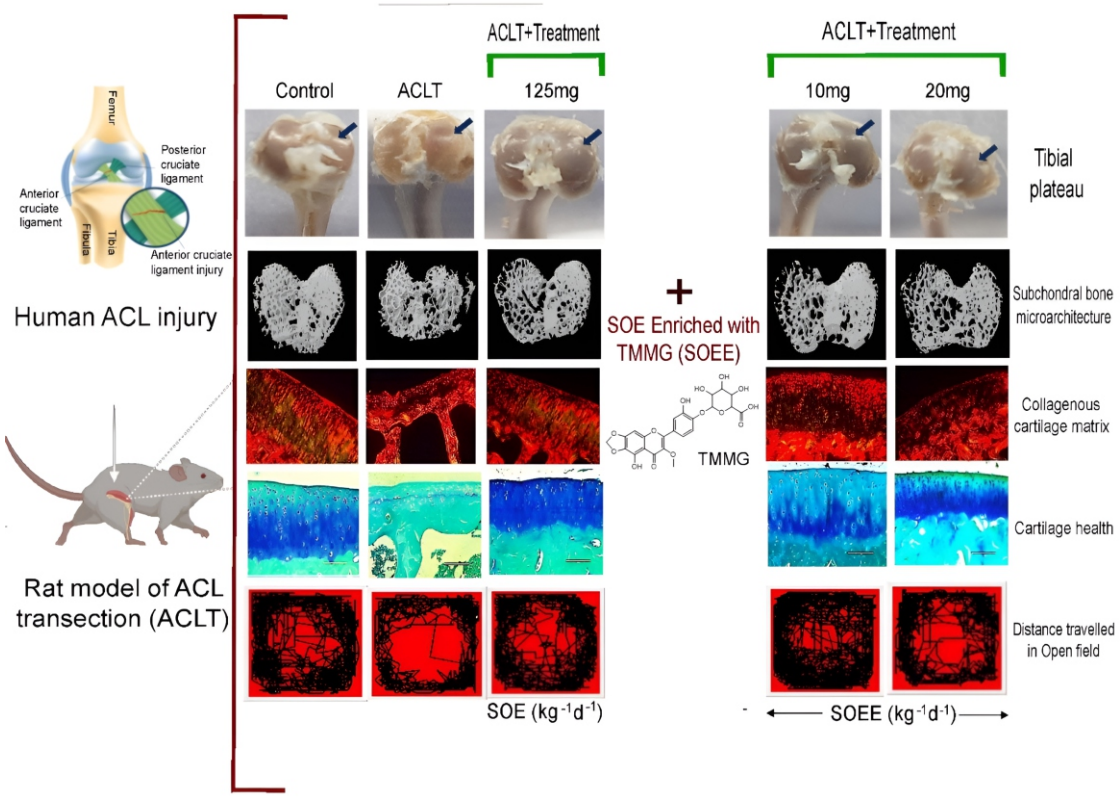


Figure: *Spinacea oleracea* enriched extract(SOEE) ameliorates cartilage health in RAT ACLT model

7.2.5. miR4352b a Cross-Species Modulator of SOSTDC1, Targets Dual Pathway to Regulate Bone Health and Fracture Healing

Mutations in SOST can lead to various monogenic bone diseases. Its paralog, SOSTDC1, shares 55 % protein sequence homology and belongs to the BMP antagonist class. This study explores the role of SOSTDC1, a BMP/Wnt antagonist, in bone health and fracture healing, highlighting its regulation by SOSTDC1 negatively influences bone formation by competing with BMP2 for receptor binding. Gma-miR4352b suppresses SOSTDC1 expression, enhancing osteogenesis and improving fracture healing. In an estrogen deficiency model, SOSTDC1 levels inversely correlated with serum BMP2 and PINP levels, indicating its role in bone loss. During fracture healing, miR4352b-treated mice showed 68% callus formation by day 10, significantly outperforming controls. These findings bridge dietary miRNAs and bone health, offering potential therapeutic targets for osteoporosis and fracture healing. (***BBA-Molecular Basis of Disease 2025, 1871, January 2025, 167514{PMID: 39326466}***).

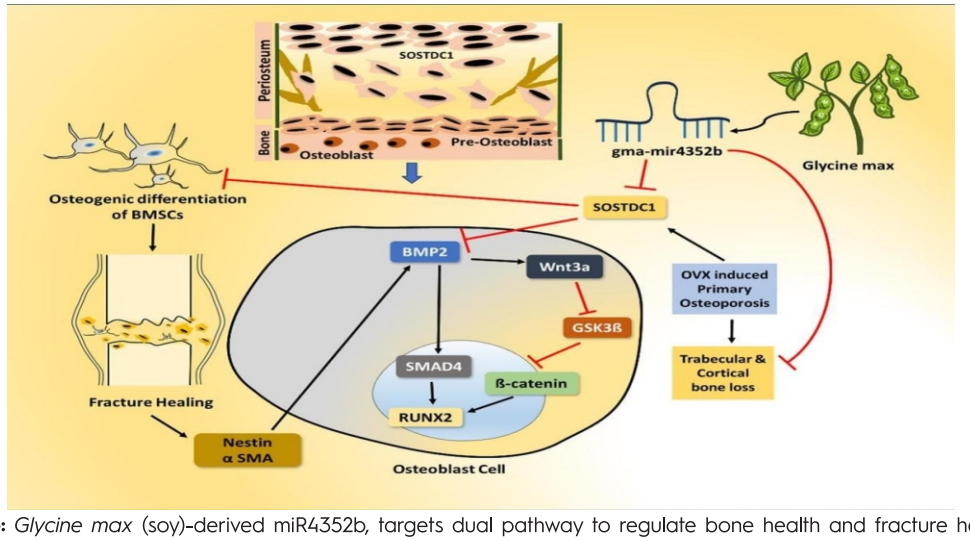


Figure: *Glycine max* (soy)-derived miR4352b, targets dual pathway to regulate bone health and fracture healing

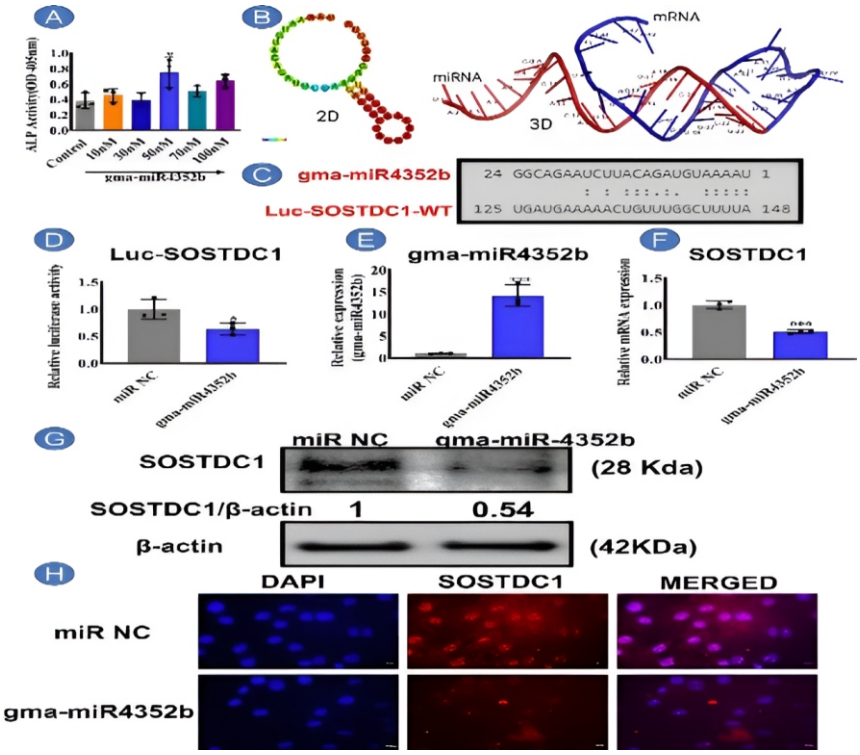
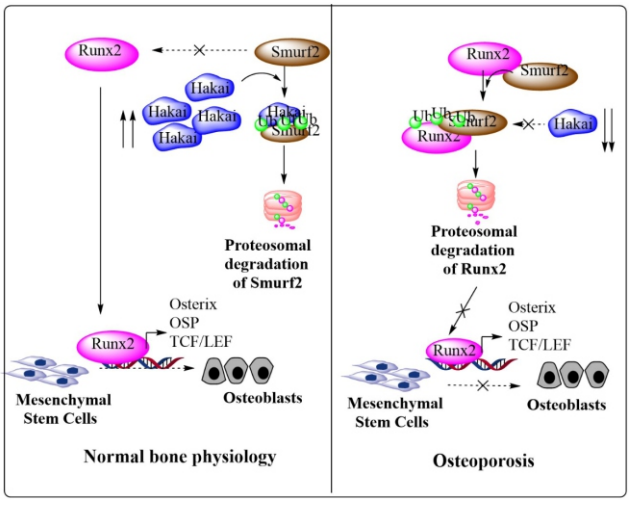


Figure: The target of gma-miR4352b is mammalian SOSTDC1. Gma-miR4352b screening in osteoblasts using the ALP assay (1A). 2D and 3D structures illustrate the molecular connection between the gma-miR4352b-SOSTDC1 mRNA interacting duplex. (1B). SOSTDC1 and gma-miR4352b putative binding was discovered (1C). Reporter luciferase activity is represented. Cells were transfected with the cloned vector with either miR NC (1D) or gma-miR4352b mimic to measure relative luciferase activity. The TaqMan assay (1E) was used to measure the relative expression of gma-miR4352b in osteoblasts. SOSTDC1's relative mRNA expression (1F). Western blot analysis, the administration of gma-miR4352b (1G) results in a decrease in SOSTDC1 expression. SOSTDC1 expression as determined by immunocytochemistry (1H).

7.2.6. Hakai, a Novel Runx2 Interacting Protein Augments Osteoblast Differentiation by Rescuing Runx2 from Smurf2-Mediated Proteasome Degradation

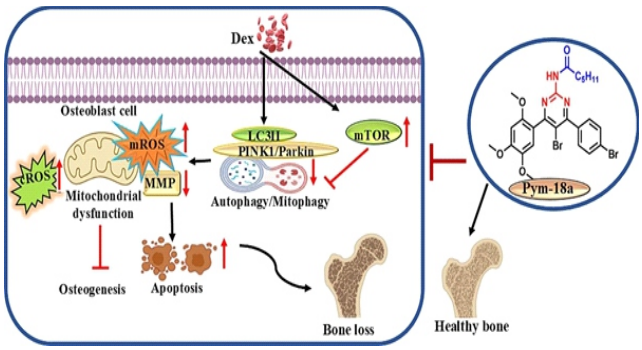
Runt-related transcription factor 2 (Runx2) is a key regulator of osteoblast differentiation and bone formation. In Runx2-deficient embryos, skeletal development ceases at the cartilage anlage stage. These embryos die of respiratory failure upon birth and display a complete absence of bone and cartilage mineralization. Here, we identified Hakai, a type of E3 ubiquitin ligase as a potential Runx2 interacting partner through affinity pulldown-based proteomic approach. Subsequently, we observed that similar to Runx2, Hakai was downregulated in osteopenic ovariectomized rats, suggesting its involvement in bone formation.

Consistent with this observation, Hakai overexpression significantly enhanced osteoblast differentiation in mesenchyme-like C3H10T1/2 as well as primary Rat Calvaria Osteoblast (RCO) cells *in vitro*. Conversely, overexpression of a catalytically inactive Hakai mutant (C109A) exhibited minimal to no effect whereas Hakai depletion markedly reduced endogenous Runx2 levels and impaired osteogenic differentiation in both C3H10T1/2 and RCOs. Mechanistically, Hakai physically interacts with Runx2 and enhances its protein turnover by rescuing it from Smad ubiquitination regulatory factor 2 (Smurf2)-mediated proteasome degradation. Wild-type Hakai but not Hakai-C109A inhibited Smurf2 protein levels through proteasome-mediated degradation. These findings underscore Hakai's functional role in bone formation, primarily through its positive modulation of Runx2 protein turnover by protecting it from Smurf2-mediated ubiquitin-proteasomal degradation. Collectively, our results demonstrate Hakai as a promising novel therapeutic target for osteoporosis. (***J Cell Physiol. 2024 Sep;239(9):e31388.*** **PMID: 39034451**).



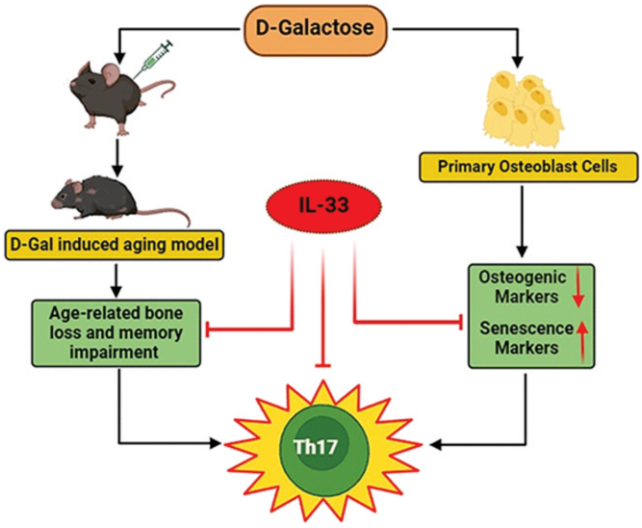
7.2.7. Pym-18a, a Novel Pyrimidine Derivative Ameliorates Glucocorticoid Induced Osteoblast Apoptosis and Promotes Osteogenesis *via* Autophagy Mitophagy Induction

Glucocorticoid-induced osteoporosis (GIOP) is the most common type of secondary osteoporosis, marked by reduced bone density and impaired osteoblast function. Current treatments have serious side effects, highlighting the need for new drug candidates. Pyrimidine derivatives have been noted for their potential in suppressing osteoclastogenesis, but their effects on osteogenesis and GIOP remain underexplored. Our recent study identified a novel pyrimidine derivative, Pym-18a, which enhances osteoblast functions. In this study, Pym-18a was found to mitigate the detrimental effects of Dexamethasone (Dex) in osteoblast cells and in GIOP in Balb/C mice. Pretreatment with Pym-18a followed by Dex (100 µM) for 24 h restored osteoblast alkaline phosphatase activity and viability. Pym-18a reduced Dex-induced apoptosis and reactive oxygen species (ROS) generation at cellular and mitochondrial levels and preserved mitochondrial membrane potential. Dex impaired autophagy and mitophagy, however but Pym-18a pretreatment increased expression of autophagy markers (LC3II) and mitophagy markers (PINK1, Parkin, TOM20) while decreasing P62 expression. The osteogenic effects of Pym-18a were diminished in the presence of 3-MA (an autophagy inhibitor). *In silico* studies showed mTOR inhibition by Pym-18a, corroborated by its suppression of Dex-induced mTOR activation. *In vivo*, Pym-18a (10 mg/kg) significantly improved bone microarchitecture, trabecular connectivity, and strength, and corrected P1NP and CTX levels altered by Dex. Pym-18a also promoted autophagy, mitophagy, and suppressed mTOR activation in GIOP mice. Overall, Pym-18a mitigates detrimental effect of Dex by modulating autophagy and PINK/Parkin mediated mitophagy through mTOR inhibition, suggesting it as a potential novel therapeutic option for GIOP. (**Biochemical Pharmacol, 2025, https://doi.org/10.1016/j.bcp.2025.116751**).



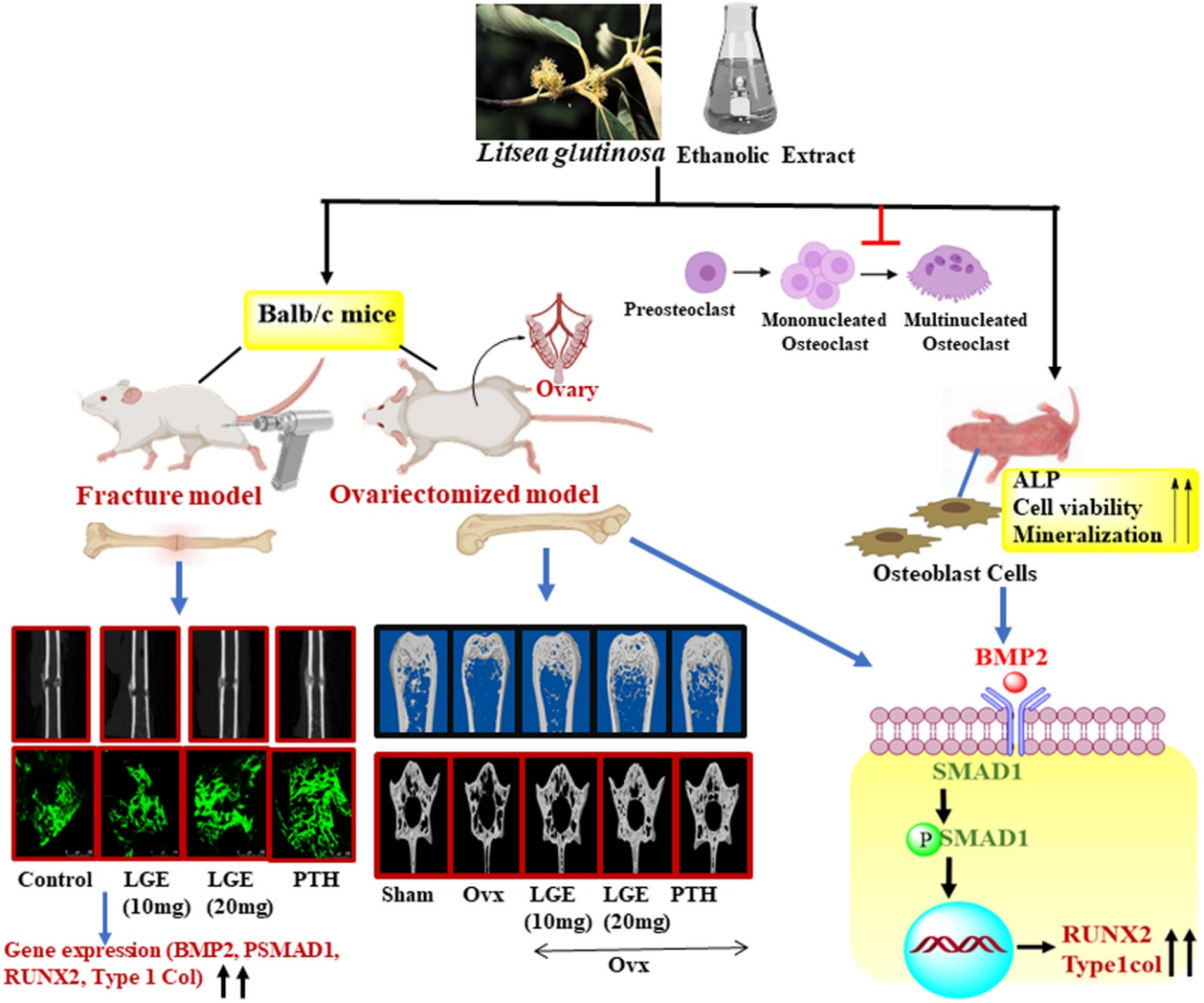
7.2.8. IL-33 Prevents Age-Related Bone Loss and Memory Impairment by Suppression of Th17 Response

Cytokines are the primary mediators of age-related disorders. The IL-17/IL-10 axis plays a crucial role in bone destruction and neuro-inflammation. Additionally, a new Th2 cytokine—IL-33—has gained attention for its potential implications in aging-associated conditions. However, the involvement of IL-33 in aging-mediated bone loss and memory impairment remains unclear and needs further investigation. This study reveals the impact of IL-33 on various aspects of the immune system, bone health, and neural functions. To induce senescence, we used d-galactose for its convenience and fewer side effects. The experimental design involved treating 20-week-old C57BL/6J mice with d-galactose subcutaneously for 10 weeks to induce aging-like effects. Thereafter, IL-33 recombinant protein was administered intraperitoneally for 15 days to evaluate its impact on various immune, skeletal, and neural parameters. The results demonstrated that d-galactose-induced aging led to bone loss and compromised osteogenic parameters, accompanied by increased oxidative stress and neurodegeneration in specific brain regions. Behavioral activities were also affected. However, supplementation with IL-33 mitigated these effects, elevating osteogenic parameters and reducing senescence markers in osteoblast cells in an aging mouse model and exerted neuroprotective potential. Notably d-galactose-induced aging was characterized by high bone turnover, reflected by altered serum levels of CTX, PTH, beta-galactosidase, and P1NP. IL-33 treatment attenuated these effects, suggesting its role in regulating bone metabolism. Furthermore, d-galactose-induced aging was associated with increased differentiation of Th17 cells and upregulation of associated markers, such as STAT-3 and ROR-γt, while downregulating Foxp3, which antagonizes Th17 cell differentiation. IL-33 treatment countered these effects by suppressing Th17 cell differentiation and promoting IL-10-producing T-regulatory cells. Overall, these findings provide insights into the potential therapeutic implications of IL-33 in addressing aging-induced bone loss and memory impairment. (**JBMR Plus, 2024, https://doi.org/10.1093/jbmrpl/ziae101**).



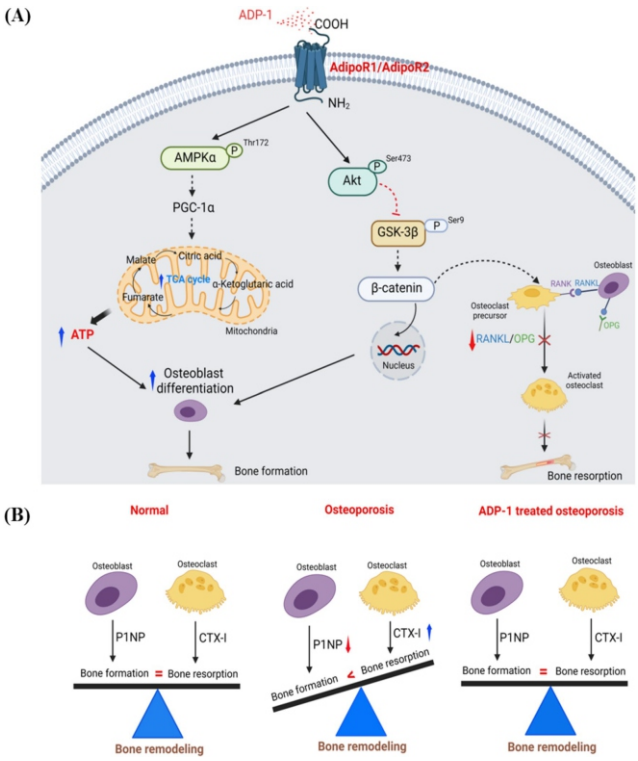
7.2.9. *Litsea glutinosa* Extract Promotes Fracture Healing and Prevents Bone Loss *via* BMP2/SMAD1 Signaling

Estrogen deficiency is one of the main causes for postmenopausal osteoporosis. Current osteoporotic therapies are of high cost and associated with serious side effects. So there is an urgent need for cost-effective anti-osteoporotic agents. Anti-osteoporotic activity of *Litsea glutinosa* extract (LGE) is less explored. Moreover, its role in fracture healing and mechanism of action is still unknown. In the present study we explore the osteoprotective potential of LGE in osteoblast cells and fractured and ovariectomized (Ovx) mice models. Alkaline phosphatase (ALP), MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) and mineralization assays revealed that LGE treatment increased osteoblast cell differentiation, viability and mineralization. LGE treatment at 0.01 µg increased the expression of BMP2, PSMAD, RUNX2 and type 1 col. LGE also mitigated RANKL-induced osteoclastogenesis. Next, drill hole injury Balb/C mice model was treated with LGE for 12 days. Micro-CT analysis and Calcein labeling at the fracture site showed that LGE (20 mg/kg) enhanced new bone formation and bone regeneration, also increased expression of BMP2/SMAD1 signaling genes at fracture site. Ovx mice were treated with LGE for 1 month. µCT analysis indicated that the treatment of LGE at 20 mg/kg dose prevented the alteration in bone microarchitecture and maintained bone mineral density and bone mineral content. Treatment also increased bone strength and restored the bone turnover markers. Furthermore, in bone samples, LGE increased osteogenesis by enhancing the expression of BMP2/SMAD1 signaling components and decreased osteoclast number and surface. We conclude that LGE promotes osteogenesis via modulating the BMP2/SMAD1 signaling pathway. The study advocates the therapeutic potential of LGE in osteoporosis treatment. (**J Endocrinol. 2024, doi: 10.1530/JOE-23-0351**).



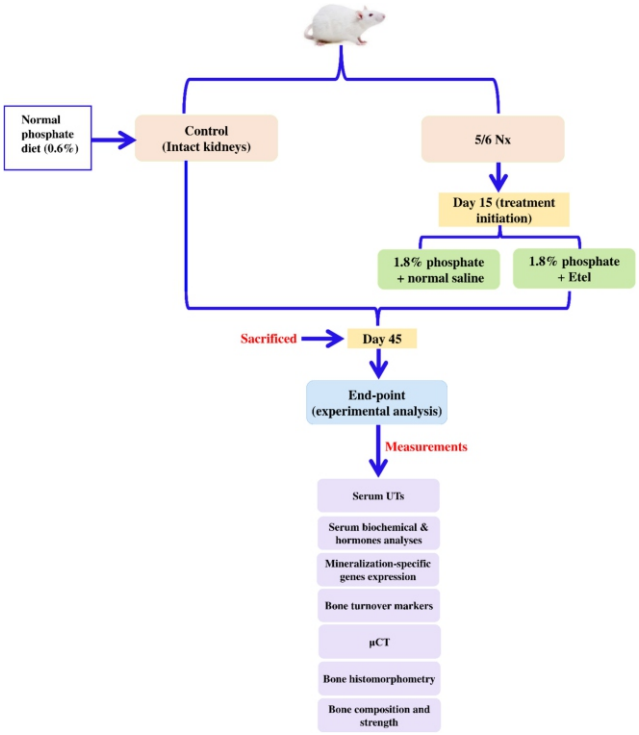
7.2.10. Osteogenic Effect of an Adiponectin-Derived Short Peptide that Rebalances Bone Remodeling: A Potential Disease-Modifying Approach for Postmenopausal Osteoporosis Therapy

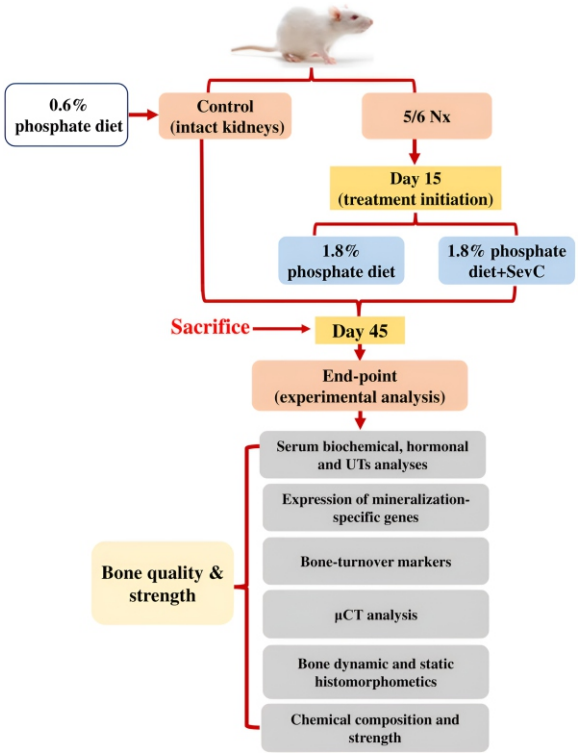
Adiponectin, an adipokine, regulates metabolic processes, including glucose flux, lipid breakdown, and insulin response, by activating adiponectin receptors 1 and 2 (AdipoR1 and AdipoR2). We have previously shown that globular adiponectin (gAd), an endogenous form of adiponectin, has osteoanabolic and anti-catabolic effects in rodent models of postmenopausal osteopenia. Moreover, we reported the identification of a 13-mer peptide (ADP-1) from the collagen domain of adiponectin, which exhibited significant adiponectin-mimetic properties. Since the clinical development of gAd is constrained by its large size, here, we investigated the osteogenic property of ADP-1. ADP-1 induced osteoblast differentiation more potently than gAd. ADP-1 elicited osteoblast differentiation through two downstream pathways that involved the participation of adiponectin receptors. Firstly, it enhanced mitochondrial biogenesis and OxPhos, leading to osteoblast differentiation. Secondly, it activated the Akt-glycogen synthase kinase 3β-Wnt pathway, thereby increasing osteoblast differentiation. Additionally, ADP-1 suppressed the production of receptor-activator of nuclear kappa B ligand from osteoblasts, enabling it to act as a dual-action molecule (suppressing osteoclast function besides promoting osteoblast function). In osteopenic ovariectomized rats, ADP-1 increased bone mass and strength and improved trabecular integrity by stimulating bone formation and inhibiting bone resorption. Furthermore, by increasing ATP-producing intermediates within the tricarboxylic acid cycle in bones, ADP-1 likely fueled osteoblast function. Given its dual-action mechanism and high potency, ADP-1 offers a unique opportunity to address the unmet clinical need to reset the aberrant bone remodeling in osteoporosis to normalcy, potentially offering a disease-modifying impact. (***Archives of Pharmacal Res 47: 736-755, 2024; doi: 10.1007/s12272-024-01509-x***)



7.2.11. Multiscale Effects of the Calcimimetic Drug, Etelcalcetide on Bone Health of Rats with Secondary Hyperparathyroidism Induced by Chronic Kidney Disease

Chronic kidney disease-induced secondary hyperparathyroidism (CKD-SHPT) heightens fracture risk through impaired mineral homeostasis and elevated levels of uremic toxins (UTs), which in turn enhance bone remodeling. Etelcalcetide (Etel), a calcium-sensing receptor (CaSR) agonist, suppresses parathyroid hormone (PTH) in hyperparathyroidism to reduce excessive bone resorption, leading to increased bone mass. However, Etel's effect on bone quality, chemical composition, and strength is not well understood. To address these gaps, we established a CKD-SHPT rat model and administered Etel at a human-equivalent dose concurrently with disease induction. The effects on bone and mineral homeostasis were compared with a CKD-SHPT (vehicle-treated group) and a control group (rats without SHPT). Compared with vehicle-treated CKD-SHPT rats, Etel treatment improved renal function, reduced circulating UT levels, improved mineral homeostasis parameters, decreased PTH levels, and prevented mineralization defects. The upregulation of mineralization-promoting genes by Etel in CKD-SHPT rats might explain its ability to prevent mineralization defects. Etel preserved both trabecular and cortical bones with attendant suppression of osteoclast function, besides increasing mineralization. Etel maintained the number of viable osteocytes to the control level, which could also contribute to its beneficial effects on bone. CKD-SHPT rats displayed increased carbonate substitution of matrix and mineral, decreased crystallinity, mineral-to-matrix ratio, and collagen maturity, and these changes were mitigated by Etel. Further, Etel treatment prevented CKD-SHPT-induced deterioration in bone strength and mechanical behavior. Based on these findings, we conclude that in CKD-SHPT rats, Etel has multiscale beneficial effects on bone that involve remodeling suppression, mineralization gene upregulation, and preservation of osteocytes. (***Bone 185:117126, 2024; doi: 10.1016/j.bone.2024.117126***).



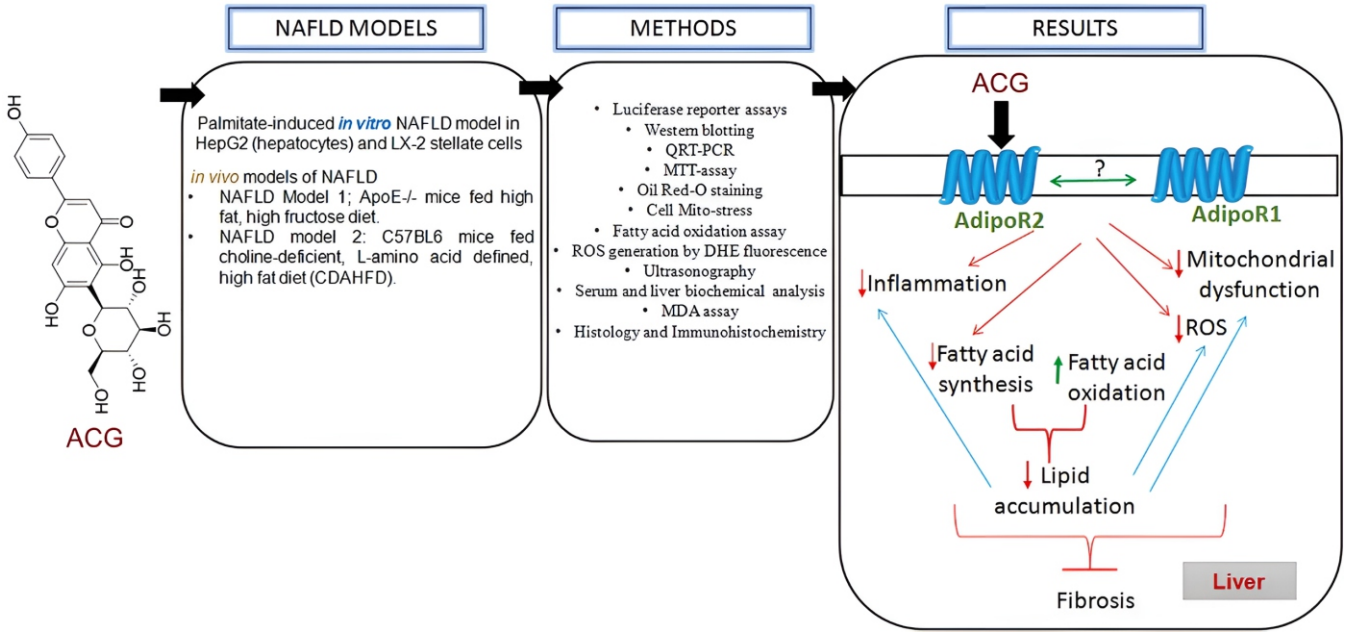


7.2.12. Multifaceted Skeletal Effects of Sevelamer Carbonate in a Secondary Hyperparathyroidism Model

Hyperphosphatemia leads to abnormal mineralization of bones and soft tissues in patients with chronic kidney disease-induced secondary hyperparathyroidism (CKD-SHPT). Sevelamer lowers phosphate levels by binding to dietary phosphate in the gastrointestinal system, forming new bone and reducing the risk of renal osteodystrophy and fracture. However, the influence of sevelamer carbonate (SevC) on bone microarchitecture, material qualities, and mechanical behavior is unknown in CKD-SHPT conditions. We utilized a rat model of CKD-induced hyperphosphatemia by feeding a 1.8% high-phosphate diet to 5/6 nephrectomized rats to test the effects of SevC on skeletal quality and strength, employing microCT, Fourier transform infrared spectroscopy (FTIR), 3-point bending, nanoindentation, and compression tests. SevC preserved mineral homeostasis and reduced PTH, and FGF-23 levels in CKD-SHPT rats. SevC mitigated the serum renal parameters, pyrophosphate levels, and indole acetic acid. In CKD-SHPT rats, SevC reduced hyperphosphatemia, improved the mineralization defect, and upregulated mineralization-promoting genes like ankyrin-1, ectonucleotide-pyrophosphatase/phosphodiesterase-1, tissue non-specific alkaline phosphatase, phosphate-regulating endopeptidase X-linked, dentin matrix protein-1, and matrix extracellular phosphoglycoprotein. In the cortical bones of CKD-SHPT rats, SevC increased cortical mass and thickness, decreased porosity by likely decreasing cortical bone remodeling induced by high PTH, and increased osteocyte preservation. SevC mitigated all of the alterations in the mineral and matrix composition of CKD-SHPT rats, including decreased collagen-maturity, mineral-to-matrix ratio, and increased carbonate substitution of hydroxyapatite crystals. SevC enhanced bone strength and mechanical behavior in CKD-SHPT rats at a macro (three-point bending) and nano (nanoindentation) scales. These findings in CKD-SHPT rats suggest that SevC improves bone mechanical properties at various levels by decreasing serum pyrophosphate, empty lacunae, and enhancing renal clearance of indole acetic acid, organized mineralmatrix deposition, and osteocyte number by suppressing cortical remodeling. (***Endocrine doi: 10.1007/s12020-025-04180-4, 2025***)

7.2.13. Apigenin-6-C-Glucoside Ameliorates MASLD in Rodent Models *via* Selective Agonism of Adiponectin Receptor 2

Adiponectin plays key roles in energy metabolism and ameliorates inflammation, oxidative stress, and mitochondrial dysfunction via its primary receptors, adiponectin receptors -1 and 2 (AdipoR1 and AdipoR2). Systemic depletion of adiponectin causes various metabolic disorders, including MASLD; however adiponectin supplementation is not yet achievable owing to its large size and oligomerization-associated complexities. Small-molecule AdipoR agonists, thus, may provide viable therapeutic options against metabolic disorders. Using a novel luciferase reporter-based assay here, we have identified Apigenin-6-C-glucoside (ACG), but not



apigenin, as a specific agonist for the liver-rich AdipoR isoform, AdipoR2 (EC_{50}: 384 pM) with >10000X preference over AdipoR1. Immunoblot analysis in HEK-293 overexpressing AdipoR2 or HepG2 and PLC/PRF/5 liver cell lines revealed rapid AMPK, p38 activation and induction of typical AdipoR targets PGC-1α and PPARα by ACG at a pharmacologically relevant concentration of 100 nM (reported cMax in mouse; 297 nM). ACG-mediated AdipoR2 activation culminated in a favorable modulation of key metabolic events, including decreased inflammation, oxidative stress, mitochondrial dysfunction, *de novo* lipogenesis, and increased fatty acid β-oxidation as determined by immunoblotting, QRT-PCR and extracellular flux analysis. AdipoR2 depletion or AMPK/p38 inhibition dampened these effects. The *in vitro* results were recapitulated in two different murine models of MASLD, where ACG at 10 mg/kg body weight robustly reduced hepatic steatosis, fibrosis, proinflammatory macrophage numbers, and increased hepatic glycogen content. Together, using *in vitro* experiments and rodent models, we demonstrate a proof-of-concept for AdipoR2 as a therapeutic target for MASLD and provide novel chemicobiological insights for the generation of translation-worthy pharmacological agents. (**European Journal of Pharmacology. 2024, 978 (5), 176800. https://doi.org/10.1016/ j.ejphar.2024.176800**).

7.2.14. Emerging Roles of Osteocytes in the Regulation of Bone and Skeletal Muscle Mass

Contrary to the popular perception that bone is merely a structural organ, decades of research has established its functional importance in whole-body metabolism. Osteocytes, which comprise >80% of all bone cells, were also initially thought to be terminally differentiated dormant cells lacking metabolic functions. New research, however, is increasingly providing evidence that osteocytes not only play a role in the structural integrity of bone but also have secretory functions that regulate other bone cells and other organs, including skeletal muscle, the structural-mechanical neighbour of the bone, via paracrine and endocrine pathways. However, interpretations of the publicly available preclinical and clinical data pertaining to the factors secreted by osteocytes and their functions in the musculoskeletal system largely fail to reach a consensus. This review aimed to objectively collate all information available in the public domain for efficient access by researchers in the field. We strongly believe that this review will assist researchers attempting the unbiased design of therapeutic strategies for musculoskeletal disorders. (**Journal of Molecular Endocrinology. 74:(1). Article ID: e240033. https://doi.org/10.1530/ JME-24-0033**)

8 Neurological Disorders

Vision :

Conduct fundamental research to push the frontiers of understanding in neuropathic pain, cerebral stroke, major depression, and neurodegenerative disorders with the overarching goal of establishing novel druggable targets and advancing therapeutic strategies

Goals :

- Discovery and characterization of synthetic and phytopharmaceutical lead candidates for neuropathic pain, treatment-refractory depression, cerebral stroke, and neurodegenerative diseases
- To establish a magnetic resonance imaging (MRI) platform for longitudinal studies of neuropsychiatric disorders such as major depression, neuropathic pain & neurodegenerative diseases using pharmacological and transgenic rodent models
- Development of genotype-specific patient-derived brain organoid model system and brain tissue bank to support fundamental studies to understand the underlying molecular, cellular and synaptic/trans-synaptic mechanisms of neurodegenerative disorders
- To establish robust manual and automated electrophysiology platforms to enable measurement of field potentials and currents live animals as well as in isolated cells & tissue sections
- To establish new assays & model systems to delineate the brain ageing mechanism and discover druggable targets
- Development of NCEs and phytopharmaceutical-based therapeutics for neuropathic pain, treatment

Front Row (L to R): Dr. Atul Goel, Dr. Shubha Shukla, Dr. Sanjay Batra, Dr. Prem N. Yadav, Dr. Prem Prakash Yadav, Dr. Sonia Verma

Second Row (L to R): Ms. Sachi Bharti, Dr. Valmik Shinde, Dr. Ajay Kumar Srivastava, Dr. Ravindra Kumar, Dr. Aravind Singh Kshatri, Dr. Kishor Mohanan, Ms. Deepmala

8.1 Drug Discovery & Development

8.1.1 GLP-CNS Safety Pharmacology studies:

- Following one NCE was evaluated for CNS safety in GLP setup.
- S016-1348, Sponsored by CSIR-PAN-Cancer mission

8.1.2 Discovery of Novel GPCR Ligands for CNS Disorders

During last one year, total **645 compounds** were submitted for screening against 5 GPCR targets (KOR, DRD5, 5-HT2C and TGR5) and following **8 hits** were found at various receptors. These hits (graphs are given below with IC50/EC50) are being pursued for selectivity, SAR and stability studies

I. Three KOR antagonist: S024-1142, S024-1148, S024-1149

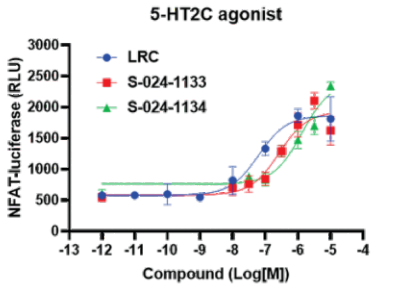
II. Two D5 receptor agonist: S024-0215, S024-225

III. Two 5-HT2C receptor agonists: S024-1133, S024-1134

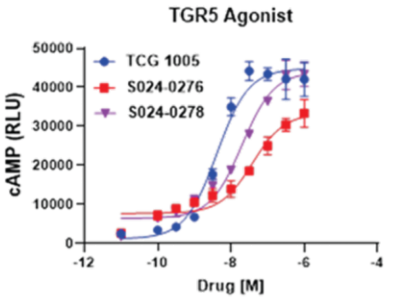
IV. Two TGR5 receptor agonists: S024-0276, S024-0276

8.1.3 Upgradation of hERG Screening Facility into GLP Compliant Mode

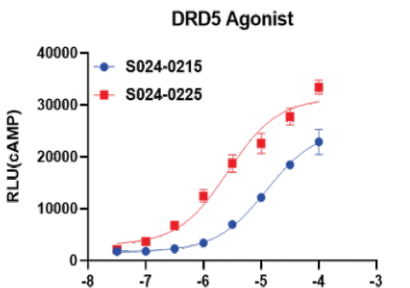
Cardiotoxicity is one of the major safety concerns in drug discovery, which is one of the primary reasons for drug development termination, market withdrawal or its restricted use. The human ether-a-go-go related gene (hERG) encodes the inward rectifying voltage-gated potassium channel in the heart (I_{Kr}) and is involved in cardiac repolarisation. Drug induced inhibition of the hERG current causes QT interval prolongation, resulting in potentially fatal ventricular tachyarrhythmia called *Torsade de Pointes*. Approximately 60% of all new molecular entities aiming at cardiac or non-cardiac targets interact with hERG channels; thus, these are considered "promiscuous targets". Therefore, evaluating effects of compounds on hERG activity early in drug discovery can significantly reduce the risk of putting extensive efforts in cardiotoxic drugs. Additionally, most investigational new drug (IND) applications require hERG channel pharmacological assessments to reduce the development of proarrhythmic drugs. A state-of-the-art hERG screening service has already been established in the institute with the funding



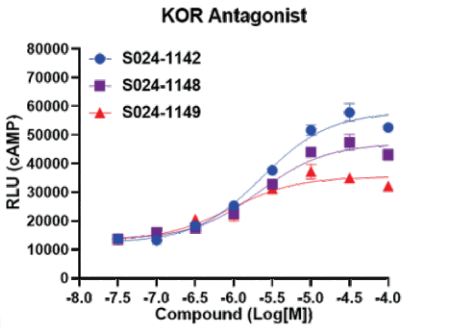
	LRC	S-024-1133	S-024-1134
LogEC50	-7.206	-6.580	-5.879



	TCG-1005	S024-0276	S024-0278
LogEC50	-8.386	-7.416	-7.698



	S024-0215	S024-0225
LogEC50	-4.909	-5.573



	S024-1142	S024-1148	S024-1149
LogIC50	-5.637	-5.665	-6.044

- Dr. Prem N Yadav
Senior Principal Scientist
& Area Coordinator

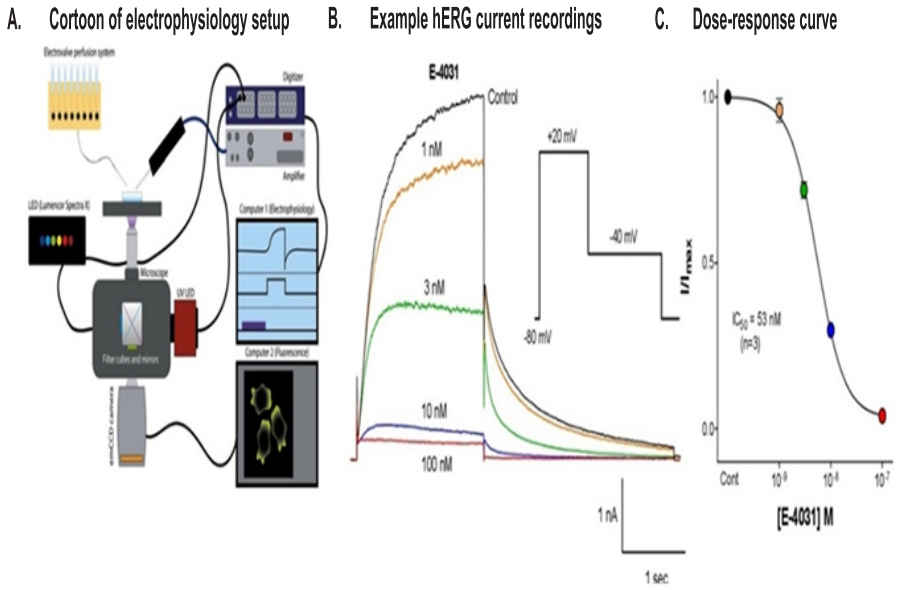


Figure 1: Dose response effect of E-4031 on hERG channel currents

hERG assay overview

Platform	Manual patch-clamp electrophysiology
Test system	HEK293-hERG stable cell line
Configuration	Whole cell
Number of concentrations	5 increasing concentrations
Positive control	E-4031
Temperature	20-24°C
Sample size	*3 cells/ treatment group*
Assay controls	*0.1% DMSO*
Voltage protocol	Holding potential at-80 mV. hERG current activation by depolarisation to +20 mV for 3s followed by a 2s repolarization to-40 mV.
Measured parameters	% Inhibition of hERG tail current and IC_{50} (if appropriate)

support of CSIR in 2024. We have now upgraded this facility into GLP compliant mode which will benefit all the internal and external users (both academic and industry).

8.1.4. Development of a Novel Hv1 Channel Inhibitor to Alleviate Chronic Pain

Chronic pain (CP) still remains enormous public health problem, with epidemiological studies estimating that about one in five adults worldwide suffer from recurring pain. The Hv_1 channel is a newly identified proton channel that is selectively expressed in the phagocytes of the immune system and the microglia of the central nervous system. It is a homodimer activated by membrane potential and pH gradient across the membrane. The pivotal role of Hv_1 channels in the pathogenesis of pain has been recently shown in neuropathic and inflammatory pain in animal models. Despite the clinical importance of Hv_1 channel-based therapeutics, no suitable inhibitor with good selectivity and *in vivo* PK profile has been identified and progressed to clinical trials. To address this research gap, we

- Dr. Prem P Yadav
Senior Principal Scientist
& Area Coordinator

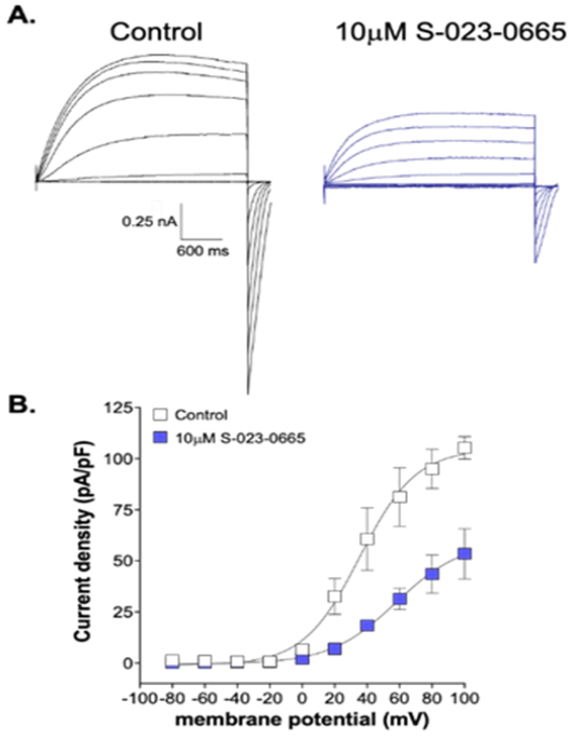


Figure 2: Inhibitory effects of S-023-0665 on Hv1 channels

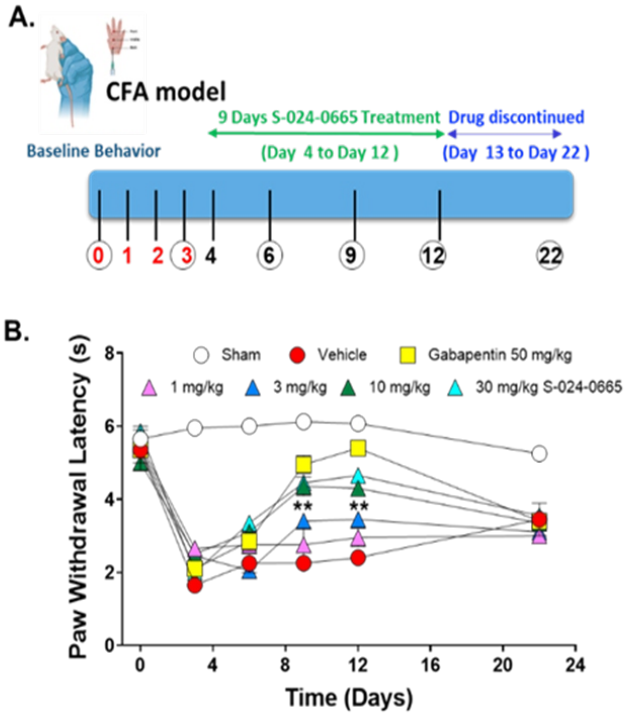


Figure 3: S-023-0665 alleviated the inflammatory pain in CFA mice model

have designed novel Hv_1 inhibitor prototypes using various methodologies, including virtual screening with docking and pharmacophore modelling. Primary screening of a chemically diverse library of compounds identified a novel Hv_1 channel inhibitor (S-023-0689, IC_{50}=384 μM) and its structure-activity relationships yielded a potent inhibitor (S-023-0665, IC_{50}=0.805 μM, patent in progress). The analgesic effect of S-023-0665 was further evaluated on the complete Freund's adjuvant (CFA) model of inflammatory pain. CFA was injected subcutaneously into the plantar surface of the right hind paw (20 μl per mouse). The control group was treated with saline and the positive control group received Gabapentin (50 mg/kg) I.P. Similar to the pain attenuation by Gabapentin, treatment with S-024-0665 significantly attenuated the thermal hyperalgesia in CFA animal models. These data suggest that S-023-0665 family of molecules could act as scaffolds for future development of Hv1 channel inhibitors for the treatment of chronic pain conditions.

8.2 Fundamental Studies

8.2.1 Functional Implications of Enrichment of Nuclear Hormonal Receptor NHR-210 in Glial Cells, Studied Employing *C. elegans* Model of Parkinson's Disease

Glial cells constitute nearly half of the mammalian nervous system's cellular composition. The glia in *C. elegans* perform majority of tasks comparable to those conducted by their mammalian equivalents. The cephalic sheath (CEPsh) glia, which are known to be the counterparts of mammalian astrocytes, are enriched with two nuclear hormone receptors (NHRs)-NHR-210 and NHR-231. This unique enrichment makes the CEPsh glia and these NHRs intriguing subjects of study concerning neuronal health. We endeavored to assess the role of these NHRs in neurodegenerative diseases and related functional processes, using transgenic *C. elegans* expressing human alpha-synuclein. We employed RNAi-mediated silencing, followed by behavioural, functional, and metabolic profiling in relation to suppression of NHR-210 and 231. Our findings revealed that depleting nhr-210 changes dopamine-associated behaviour and mitochondrial function in human alpha synuclein-expressing strains NL5901 and UA44, through a putative target, pgp-9, a transmembrane transporter. Considering the alteration in mitochondrial function and the involvement of a transmembrane transporter, we performed metabolomics study via HR-MAS NMR spectroscopy. Remarkably, substantial modifications in ATP, betaine, lactate, and glycine levels were seen upon the absence of nhr-210. We also detected considerable changes in metabolic pathways such as phenylalanine, tyrosine, and tryptophan biosynthesis metabolism; glycine, serine, and threonine metabolism; as well as glyoxalate and dicarboxylate metabolism. In conclusion, the deficiency of the nuclear hormone receptor nhr-210 in alpha-synuclein expressing strain of *C. elegans*, results in altered mitochondrial function, coupled with alterations in vital metabolite levels. These findings underline the

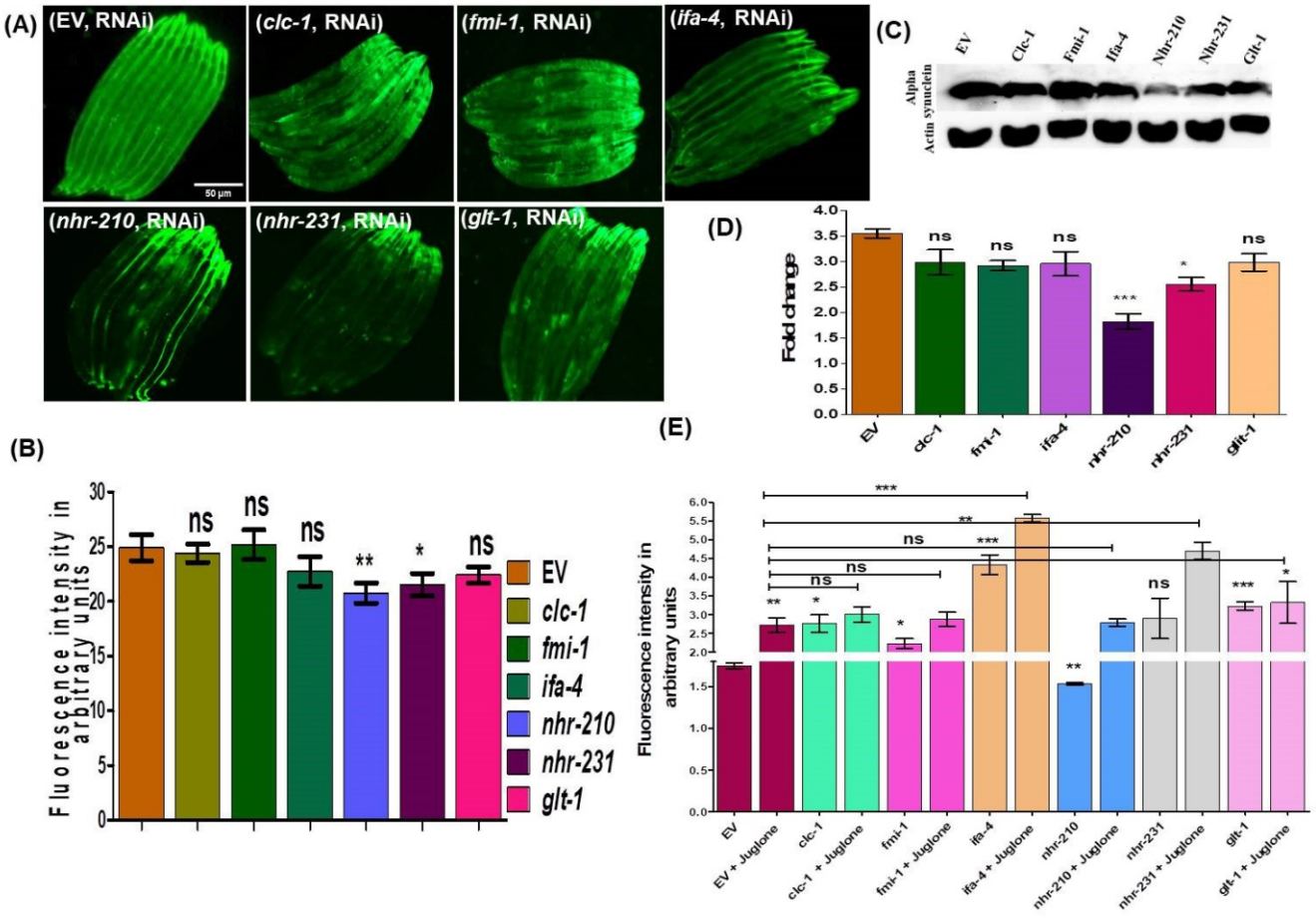
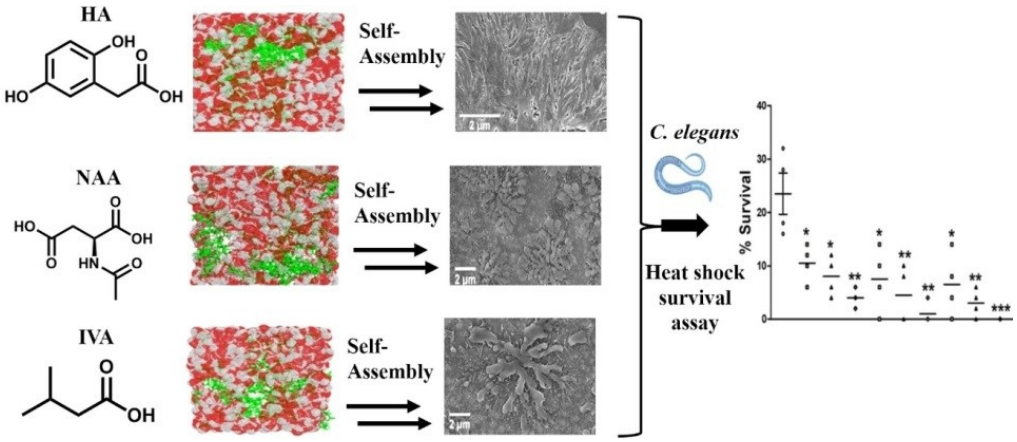


Figure 4: (A) Representative photomicrographs of NL5901 strain of *C. elegans,* expressing human alpha-synuclein protein, control (EV),*clc-1* knockdown, *fmi-1* knockdown,*ifa-4* knockdown, *nhr-210* knockdown,*nhr-231* knockdown, and *glt-1*knockdown. **(B)** Column graph shows the relative fluorescence intensity in arbitrary units, N=30 at 10x, scale bar 50 µm, (* P-value <0.05). **(C)** Representative blot showing the expression of human alpha synuclein upon the RNAi of CEPsh genes. **(D)** Column graph shows densitometry analysis of the representative blot, (* P-value <0.05). **(E)** The column graph showing ROS level upon the RNAi of CEPsh genes with and without juglone (positive control), employing N2 strain (wild type), n=300, (* P-value <0.05).

functional and physiological importance of nhr-210 enrichment in CEPsh glia (***Cellular Molecular Life Sciences 2024, PMID: 38691171***).

8.2.2 Homogentisic Acid, N-Acetyl Aspartic Acid and Isovaleric Acid Studied for their Aggregation Propensity and Role in Metabolic Disorders

The transformation of metabolites into amyloidogenic aggregates represent an intriguing dimension in the pathophysiology of metabolic disorders, including alkaptonuria, canavan disease, and isovaleric acidemia. Central to this phenomenon are the metabolites homogentisic acid (HA), N-acetyl aspartic acid (NAA), and isovaleric acid (IVA), which we found, weave an intricate network of self-assembled structures. Leveraging an array of microscopy techniques, we traced the morphological behavior of these assemblies that exhibit concentration and time-dependent morphological transitions from isolated globules to clustered aggregates. MD simulation studies suggest significant role of hydrogen bonding interactions in the aggregation process. While displaying strong amyloidogenic propensity in solution, these aged aggregates were significantly cytotoxic to mouse neural N2a cell lines. *In vivo* effect in *C. elegans* nematode further validated cytotoxicity of aggregates. Our findings provide fresh insights to amyloidogenic nature of HA, NAA, and IVA aggregates and their possible role in associated metabolic disorders such as alkaptonuria, canavan disease and isovaleric academia (***ChemBioChem 2024,PMID: 39312502***).



8.2.3 Neuroprotective Role of Caffeine Against Memory Impairment in Rat Model of Alzheimer's Disease

Caffeine possesses potent antioxidant, anti-inflammatory and anti-apoptotic activities against a variety of neurodegenerative diseases, including Alzheimer's disease (AD) and Parkinson's disease (PD). The goal of this study was to investigate protective role of a psychoactive substance like caffeine on hippocampal neurogenesis and memory functions in streptozotocin (STZ)-induced neurodegeneration in rats. Caffeine is a natural CNS stimulant, belonging to the methylxanthine class, and is a widely consumed psychoactive substance. It is reported to abate the risk of various abnormalities that are cardiovascular system (CVS) related, cancer related, or due to metabolism dysregulation. Short-term caffeine exposure has been widely evaluated, but its chronic exposure is less explored and pursued. Several studies suggest a devastating role of caffeine in neurodegenerative disorders. However, the protective role caffeine on neurodegeneration is still unclear. Here, we examined the effects of chronic caffeine administration on hippocampal neurogenesis in intracerebroventricular STZ injection induced memory dysfunction in rats. The chronic effect of caffeine on proliferation and neuronal fate determination of hippocampal neurons was done by double colabeling of neurons by thymidine analogue BrdU to label new born cells, DCX (a marker for immature neurons) and NeuN to label mature neurons. STZ (1 mg/kg, 2 µl) was

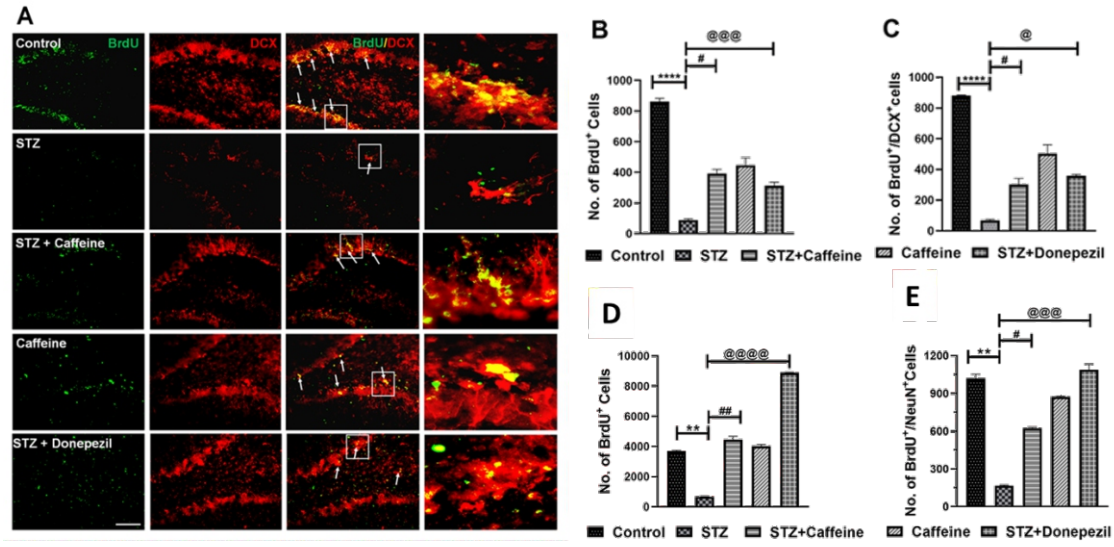


Figure 5. Effect of caffeine treatment on neuronal proliferation and maturation in hippocampal DG region: (A) Pictomicrograph represents doublecortin (DCX) immunofluorescence of hippocampal dentate gyrus region. **(B)** bar graph showed increased number of $BrdU^+$ cells after caffeine treatment. **(C)** double colabeling with DCX (a marker of immature neurons) and BrdU (a marker of cell proliferation) showed decreased number of $DCX^+/BrdU^+$ cells after STZ lesioning which was improved by caffeine treatment **(D)** Immunohistochemical analysis showed decreased expression of $BrdU^+$ cells after STZ lesioning that was subsequently enhanced by caffeine treatment **(E)** double colabeling of NeuN a marker of maturation with BrdU a marker of cell proliferation showed increased number of $BrdU^+/NeuN^+$ cell after caffeine treatment. Values are Mean ±SEM, n=3. *p < 0.05, **p < 0.01, ***p < 0.001. #p < 0.05, ##p < 0.01, ###p < 0.001, @p < 0.05, @@p < 0.01, @@@p < 0.001. * control *vs* STZ, # STZ *vs* STZ+Caffeine, @STZ *vs* STZ+Donepezil.

injected stereotaxically into the lateral ventricles (intracerebroventricular injection) once on day 1, followed by chronic treatment with Caffeine (10 mg/kg, I.P) and Donepezil (5 mg/kg, I.P.), and the protective effect of caffeine on cognitive impairment and adult hippocampal neurogenesis was evaluated. Our findings showed decreased oxidative stress burden and amyloid burden following caffeine administration in STZ lesioned SD rats. Further double immunolabeling with bromodeoxyuridine$^+$/doublecortin$^+$ (BrdU$^+$/DCX$^+$) and bromodeoxyuridine$^+$/neuronal nuclei$^+$ (BrdU$^+$/NeuN$^+$) indicated caffeine improved neuronal stem cell proliferation and long term survival after Caffeine administration in STZ lesioned rats. Our findings support the neurogenic potential of caffeine in STZ induced neurodegeneration.

8.2.4 Identification of Potential Genes Driving Ferroptosis in the Substantia Nigra and Dopaminergic Neurons in Parkinson's Disease

Parkinson's disease (PD) is a neurodegenerative disorder marked by dopaminergic (DA) neuron degeneration in the substantia nigra (SN). Conventional dopamine replacement therapies provide limited long-term efficacy and significant side effects. Emerging evidence suggests ferroptosis—a form of cell death driven by iron-dependent lipid peroxidation—contributes to PD pathology, though direct evidence linking dysregulation of ferroptosis-related genes in DA neuron loss in PD remains limited. This study explores the expression of ferroptosis-associated genes in the SN and DA neurons of PD patients, identifying potential therapeutic targets. We analyzed two independent RNA-seq datasets, GSE7621 and GSE8397 (GPL-96), from the GEO database to identify common differentially expressed ferroptosis-related genes (cDEGFr) in the SN of PD patients. We also conducted Gene Ontology and pathway enrichment analyses of these genes to explore the underlying mechanisms and constructed a protein-protein interaction network. The findings were further validated using an additional dataset, GSE49036. We further explored the dysregulation of these ferroptosis-related genes in DA neurons using RNA-seq data GSE169755, derived from DA neurons isolated from the SN of PD patients and controls. Lastly, the proposed hypothesis was experimentally validated in an *in vitro* PD model. This comprehensive multi-dataset analysis uncovers novel insights into the expression of ferroptosis-related genes in PD, suggesting potential biomarkers and therapeutic targets for mitigating DA neuron loss and PD progression. ACE2/ANG-(1-7)/Mas receptor axis activation prevents inflammation and improves cognitive functions in SD rats (**Mol Cell Neurosci, 2025**).

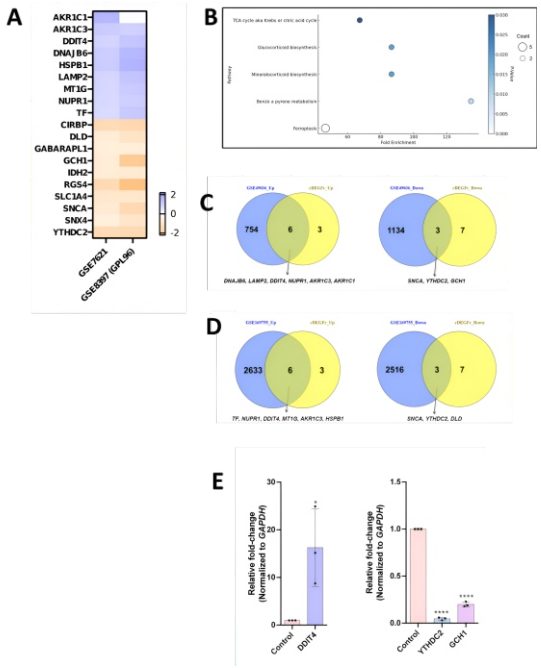


Figure 6. A) Heatmap showing the differential expression of the 19 $cDEG_{Fr}$ ($p \leq 0.05$) between SN-PD and SN-control samples across datasets, GSE7621 and GSE8397 (GPL96). B) WIKIpathway enrichment analysis of the $cDEG_{Fr}$. C) Venn diagram comparing genes up-regulated and down-regulated genes in SN-PD of GSE49036 with up-regulated $cDEG_{Fr}$. D) Venn diagram comparing genes up-regulated and down-regulated in DA-PD of GSE169755 with up-regulated $cDEG_{Fr}$. E) Validating the expression of $cDEG_{Fr}$ in the 1-methyl-4-phenyl 1,2,3,6 tetrahydropyridine-treated SH-SY5Y model of PD using qRT-PCR. Bar graph displaying the over-expression of *DDIT4* and reduced expression levels of *YTHDC2* and *GCH1* in SH-SY5Y cells treated with MPTP (400 µM) for 24hrs. Cells treated with 1% DMSO were used as controls. *GAPDH* was used for normalization. The data represent the mean ±S.D (n=3); * p<0.05; ****p<0.0001.

8.2.5 TGR5 Activation Attenuates Neural Stem Cell Senescence

G-protein coupled bile acid receptor 1, also known as Takeda G-protein coupled receptor TGR5, is a Gαs-coupled GPCR discovered in 2002 by Maruyama. TGR5 is an endogenous bile acid receptor, which upon activation is known to initiate a number of signaling pathway modulating multiple physiological responses. TGR5 mRNA has been detected in many rodent and human brain tissues, including macrophages/monocytes, gallbladder, placenta, intestine, liver, and brain. However, the precise role of TGR5 signaling in CNS is still not clear. Given that neural stem cell (NSC) homeostasis is considered paramount in healthy ageing and mood, its proliferation and adult neurogenesis has been shown to be significantly reduced during ageing and brain injury. Also, compelling preclinical evidence suggests that the NSC senescence, triggered either by low-grade sterile inflammation or accumulation of DNA damage, is one of the underlying mechanisms of impaired brain regenerative capacity and hence a risk factor for neurodegenerative disorders. Therefore, once we found that TGR5 is quite abundantly expressed in mice hippocampal NSCs, we investigated whether TGR5 activation could rescue NSC senescence. Using very modest concentration of IL6 (10 ng/ml, for 48 hr), we first induced the NSC senescence and the, treated with various concentrations of TGR5 selective agonist TCG-100 for 24 hrs. The western analysis and immuno-cytochemical analysis of NSC revealed that TGFR5 agonist rescued the NSC senescence in a concentration-dependent manner (Fig. 7). These results, for the first time, offer molecular and cellular insight into the very important role of the bile acid receptor in NSC homeostasis.

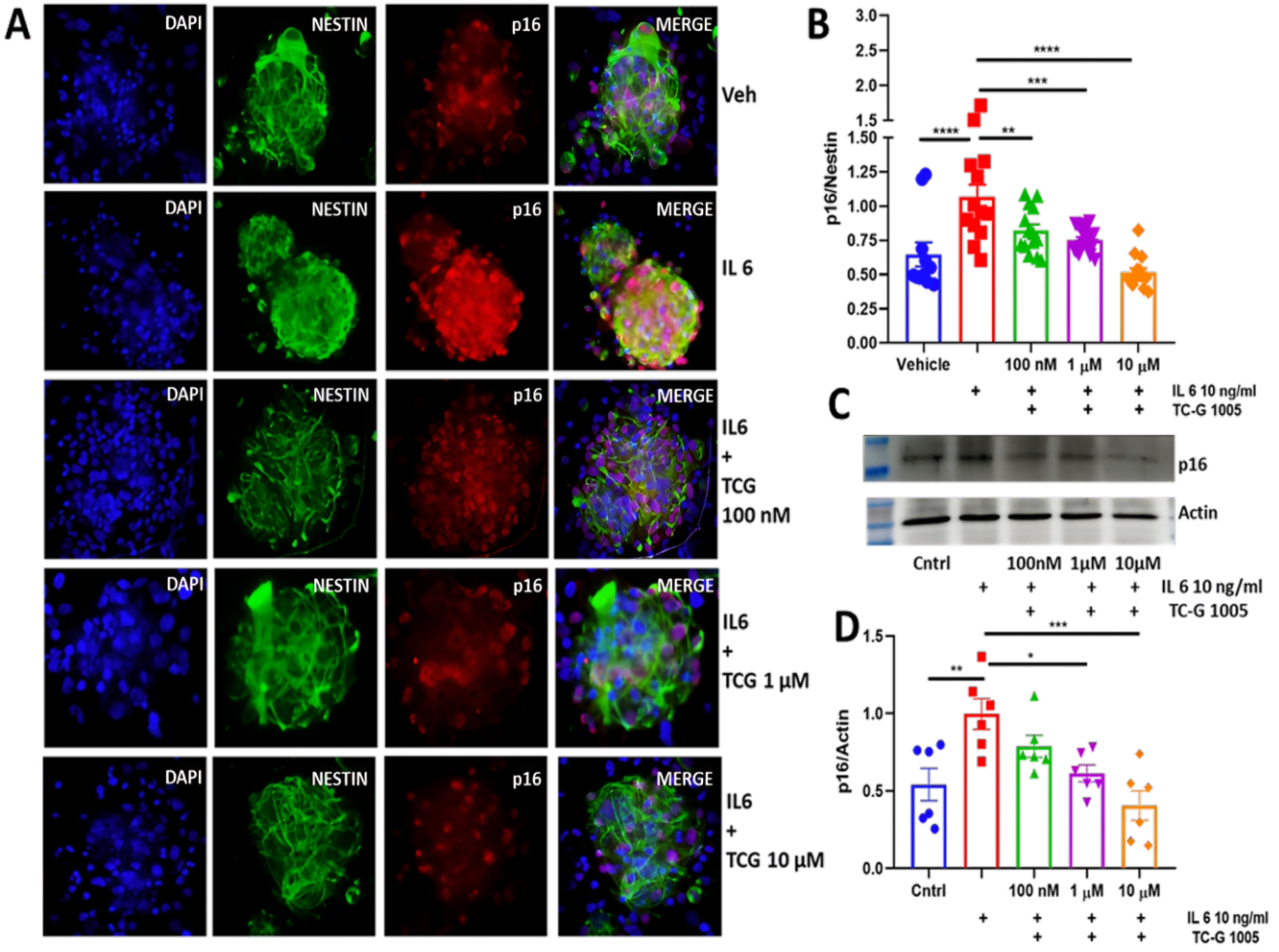


Figure 7. Effect of TGR5 agonism on NSC senescence *in vitro*. (A) Fluorescent images showing decrease in p16 expression due to TCG 1005. (B) Bar graph depicting p16 expression in panel (A),**p<0.01, ***p<0.001, ****p<0.0001, ANOVA/Dunnet's multiple comparison. (C) Immunoblot showing p16 expression. (D) Bar graph depicting p16 expression shown in panel (C) (*p<0.05; **p<0.01, ***p<0.001, one-way ANOVA/ dunnett's multiple comparison).

8.2.6 Chemokine CXCL20 as the Orchestrators of Brain Aging

Chemokines are 8 to 14kDa small secreted proteins that recruit and activate immune and non-immune cells both *in vivo* and *in vitro*. Chemokine receptors belong to the GPCR family, and multiple lines of emerging evidence suggest that several chemokines are elevated in the brain of neurodegenerative disorders. We observed increased CXCL10 expression in an age-dependent manner in mice brains. This leads us to hypothesize that CXCL10, being a component of SASPs, may aggravate/perpetuate the brain aging process and, finally, neurodegenerative diseases. To test this hypothesis, we treated the primary cortical neuron (DIV-7-8) and found increased expression of proteins that regulate cellular senescence. Additionally, we found that CXCL10 attenuates the autophagy in brain tissues as well as in primary cortical neurons. Finally, we demonstrated that increased CXCR3 (cognate receptor of CXCL10) signaling negatively alters glutamatergic neurotransmission *in vivo* as well as *in vitro*. Overall, our observation supports the hypothesis that CXCL10, an agonist of CXCR3, facilitates brain aging and could be targeted for the management of ageing-associated CNS disorders.

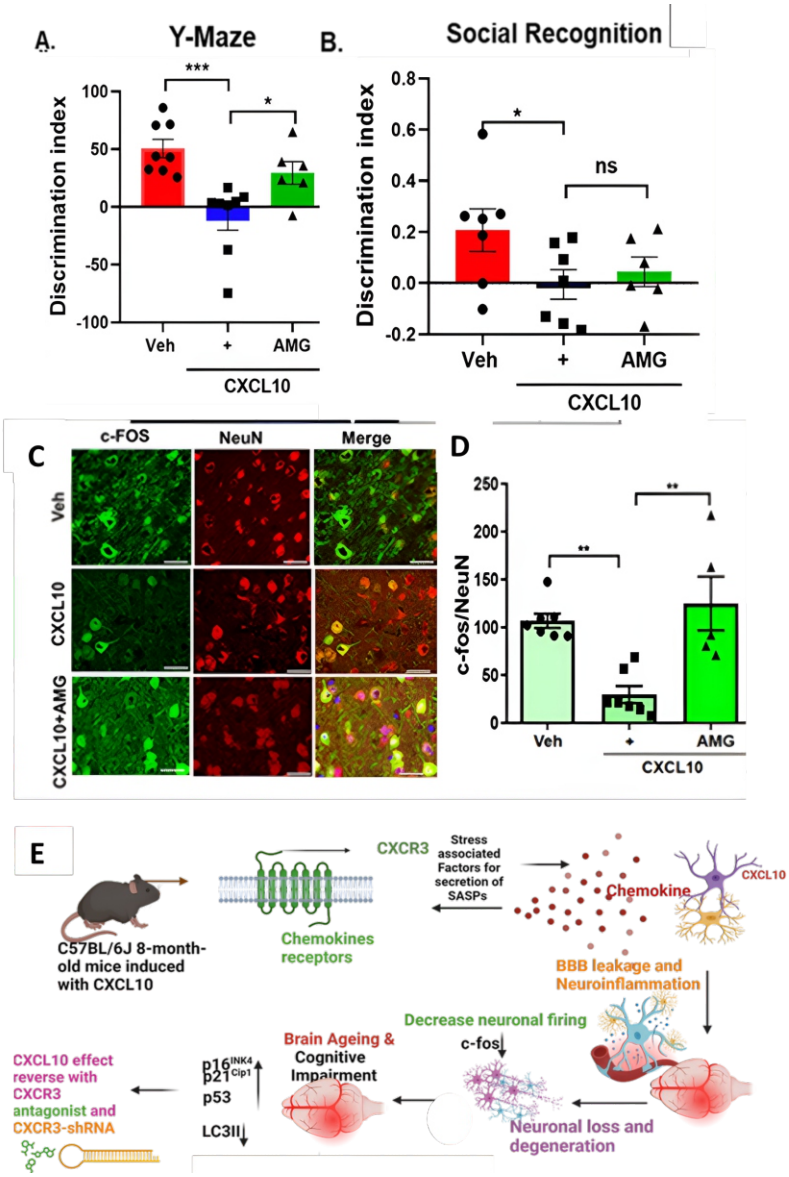


Figure 8. Increaded signaling of CXCR3 in brain induced cellular senescence and cognitive impairments. (**A,B**) CXCR3 agonist CXCL10 induces cognitive impairment in adult C57BL6 mice. (**C,D**) Chronic icv infusion of CXCL10 (10 pmoles/kg/day for 28 days) impaired spontaneous neuronal activation as measured by cFOS driven GFP expression in prefrontal cortex of mice. (**E**) Graphical illustration of overall mechanisms of CXCR induced brain ageing in mice.

9 Reproductive Health

Vision :

Addressing reproductive health issues by focusing on all major aspects, including the identification of new methods of diagnosis, the deciphering of the molecular mechanisms underlying disease etiology, and the identification of new methods of treatment

Goals :

- Understanding of the causes of male and female infertility
- Investigate fundamental mechanisms operational in spermatogenesis, oogenesis, folliculogenesis
- Investigate molecular genetics causes of male infertility
- Investigate the role of sperm RNAs in fertility and transgenerational inheritance
- Dissecting the contribution of environmental factors as contributors to epigenetic changes in male infertility
- Deciphering the molecular alterations in female infertility (PCOS and endometriosis)

(L to R): Dr. Rajesh Jha, Dr. Durga Prasad Mishra, Dr. Monika Sachdev, Dr. K. V. Sashidhara, Dr. Rajender Singh, Dr. T Narender

- Dr. T Narender
Chief Scientist &
Area Coordinator

9.1 Human Sperm sncRNAome Composition: A Critical Step Towards the Identification of Sperm Quality and Fertility Biomarkers

The explosion of studies on sperm small non-coding RNAs (sncRNAs) in the last decade and their potential as sperm fertility/quality biomarkers has made it mandatory to understand the normal human sperm small non-coding RNAome (sncRNAome) to facilitate deeper investigations on sperm sncRNAs. In the present study, we analyzed sperm sncRNA in 54 normozoospermic fertile donors and analyzed the major sncRNA forms known till date in an attempt to define the normal human sperm sncRNAome. For comparison with other populations, we downloaded sperm sncRNA datasets for eligible Chinese (n=78), American (n =14) and Spanish (n=2) normozoospermic (fertile or presumptive fertile) samples. We observed that rsRNAs and tsRNAs constituted up to 80% of the sncRNAome, with rsRNAs occupying the top spot in three populations. We identified 17 miRNAs that were consistent across all populations, suggesting them to be critical to spermatogenesis/fertility. Interestingly, all sperm piRNAs in Indian samples originated from the piRNA cluster on chromosome 15, and chromosome 15 cluster piRNAs were predominantly present in sperm across all populations. We found that most of the tsRNAs across all populations were contributed by tRNA-Gly-GCC, but the second most contributor differed across populations. mt-tsRNAs showed a significantly different pattern than nuclear tsRNA. Though mt-tsRNAs also followed the rule of major contribution by one mt-tRNA, the dominant contributor differed across populations. Further, the top contributing tRNAs to nuclear and mitochondrial tsRNAs were also different. In the case of tsRNAs and mt-tsRNAs, 5' sequences were in much higher frequency in comparison to 3' sequences. The maximum numbers of rsRNAs were derived from 28S rRNA across all populations. Ys4RNAs constituted the top fraction in the YsRNA pool. The dominant peaks for almost all sncRNA biotypes showed population-wise differences by one to a few nucleotides. While some of these differences could arise due to technical variations across studies, a number of them could be contributed by environmental factors, including health status, stress, diet, BMI, and other exposures.

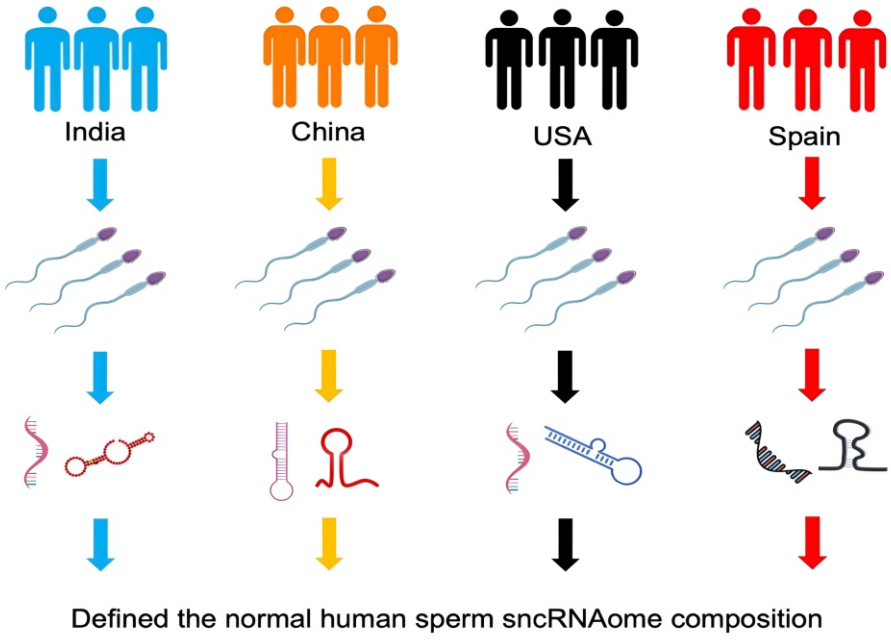


Figure 1: Human sperm sncRNAome was decoded by sncRNA comparison across four populations.

We conclude that sperm sncRNAome in Indian samples constituted rsRNAs (13.71-78.76%), YsRNAs (0.64%-76.53%) and tsRNAs (5.63-35.16%) as the major fraction and miRNAs, piRNAs, mt-tsRNAs, and other sncRNAs as the minor fraction. Across three other populations, rsRNAs (11-80%) and tsRNAs (10-60%) constituted the major fraction, and YsRNAs (0.62-4.28%), miRNAs (0.41-7.37%), piRNAs (1.37-4.36%), mt-tsRNAs (0.14-4.33%), other sncRNAs constituted the minor fraction. It appears that the human sperm sncRNAome has a 'core component' that shows small variations and a 'peripheral component' that shows significant variations across individuals and populations. The availability of the normal human sperm sncRNAome would help delineate biologically meaningful variations from sample-to-sample natural variations (***Reprod Biol Endocrinol* 23, 36 (2025). https://doi.org/10.1186/s12958-025-01358-3**).

9.2 SPAG17 Gene Mutation in a Case with Sperm Tail Defects

Defects in sperm size and form, known as teratozoospermia, can adversely impair sperm motility and its ability to fertilize an oocyte. Teratozoospermia has been most often linked with genetic abnormalities with close to 100 genes known. The primary objective of this study was to investigate the genetic basis of oligoasthenoteratozoospermic infertility in an infertile man. We performed the whole exome sequencing, followed by *in silico* filtration of observed genetic variations. Filtered rare variants were assessed for their pathogenic nature on the basis of scores assigned by various *in-silico* tools and their biological relevance to sperm structural development. The potentially pathogenic mutation was validated by Sanger sequencing. Our study identified a homozygous substitution, c.4511A>G, in the *SPAG17* gene as a potential pathogenic mutation associated with oligoasthenoteratozoospermic infertility in the case under investigation. The mutation resulted in the substitution of asparagine with serine at the 1504th amino acid position in a protein of 2223 amino acids. This mutation showed a minor allele frequency of 0.0004671 in the gnomAD database. ACMG classification suggested this mutation to be likely pathogenic. Our study identified a homozygous likely pathogenic mutation (c.4511A>G, Asn1504Ser) in the *SPAG17* gene that explains oligoasthenoteratozoospermic infertility in the present case. **(Front. Reprod. Health, 2025**

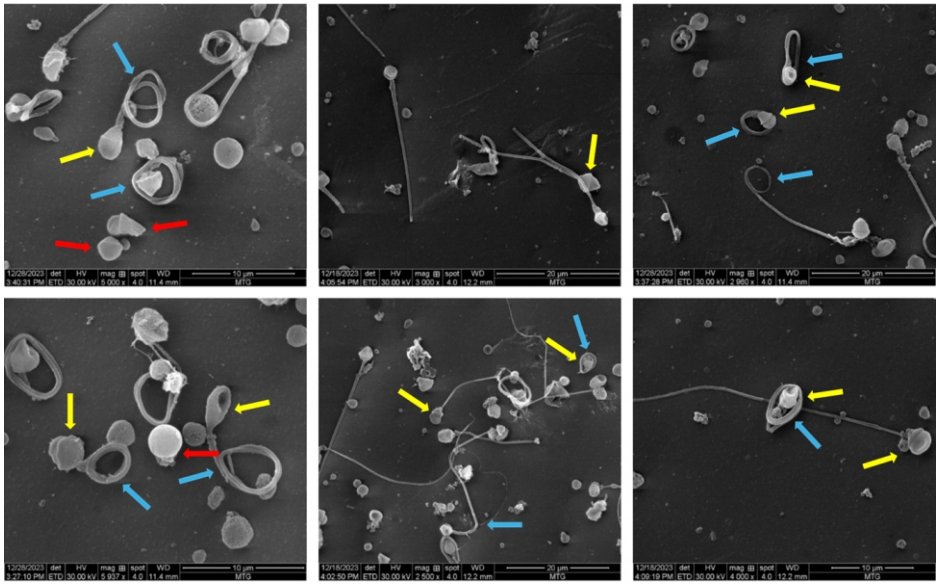


Figure 2: Scanning electron microscopy images showing various morphological deformities observed in the sample. The yellow arrows represent the abnormal collar-like structure around the sperm head, the blue arrows indicate tail abnormalities, and red arrows indicate acaudate sperm

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Senior Principal Scientist
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https://doi.org/10.3389/frph.2025.1554027).

9.3 A Comprehensive Plan to Identify and Tackle Somatic DNA Contamination in Sperm Epigenetic Studies

Recent interest in sperm DNA methylation has stemmed from its implication in sperm DNA quality, sperm fertility, environmental toxicity, and transgenerational inheritance. Sperm DNA methylation data may be significantly affected by somatic DNA contamination, resulting in misleading conclusions. However, detecting and dealing with somatic cell contamination in semen samples can be a challenging task. In the present study, we have put together a detailed and robust plan to deal with somatic cell DNA contamination in sperm epigenetic studies in order to draw error-free scientific conclusions. This comprehensive plan, if followed, can ensure the complete elimination of the influence of somatic DNA contamination in sperm DNA methylation studies.

We conclude with putting up a comprehensive sequential plan for detecting and excluding somatic cell contamination in sperm DNA methylation studies. There are quality checks at every step to ensure the removal of somatic cells or the exclusion of a sample with somatic cell contamination. In the case of a failure to detect at any of these levels and the eventual inclusion of a sample with minor contamination in the analysis, the final cut-off of 15% at the level of data analysis would ensure that somatic DNA contamination does not contribute to the overall analysis and the conclusions drawn are not biased. This way, DNA methylation studies on sperm would benefit from advanced planning to ensure the complete removal of somatic DNA contamination, which may otherwise become a critical issue at the time of study evaluation during or after publication. We believe our study would provide investigators with a ready standard operating procedure to be followed in sperm DNA methylation studies. (**Front. Reprod. Health, 05 February 2025**)

9.4 A High Level of MCP-1 Mediates ILK Signaling and MCP-1- ILK Affects the Pregnancy Outcome During Endometriosis

Endometriosis is a prevalent endocrinological gynecological problem and affect nearly 10% females worldwide. In women with endometriosis, monocyte chemoattractant protein 1 (MCP-1) or chemokine (C-C motif) ligand 2 (CCL2) is reported elevated in the circulation and even local tissue (Serum, peritoneal fluid, and endometriotic lesions). However, the precise role of it is not clear in endometriosis. In our recent study, we reported that ILK is activated in the endometriosis by MCP-1 leading to inflammatory response in the mouse model (Soni et al., 2024). We reported MCP-1

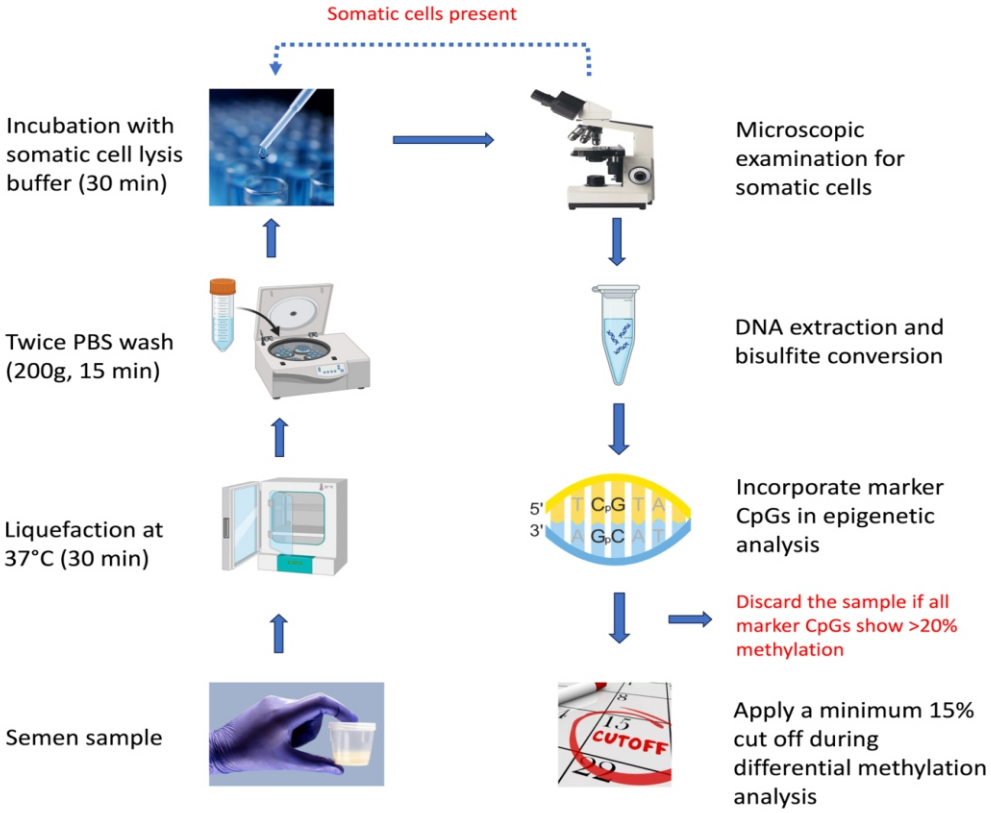

Figure 3: The flow-chart illustrates the overall scheme to be followed to get rid of the influence of somatic cell contamination in sperm epigenetic studies.

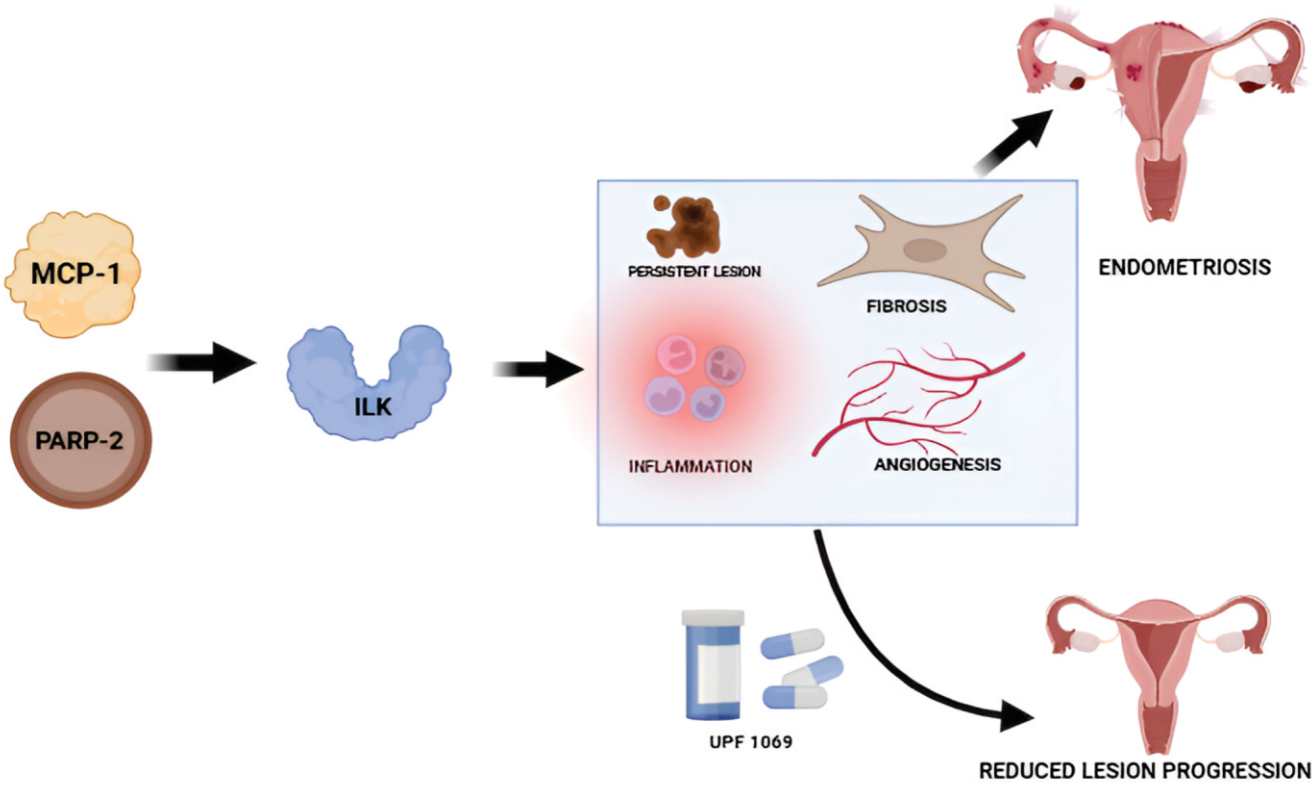

Figure 4: The contribution of PARP-2 to endometriosis and how pharmacological inhibition of PAPR-2 helps in tackling endometrial lesion progression.

mediated ILK inflammatory response in a mouse endometriosis model and favored endometriotic cell aggregation, colonization, migration, and invasion, which can be reversed by the ILK inhibitor compound (CPD) 22 (600nM) which can be inhibited by ILK pharmacological inhibitor (Soni et al., 2024). The MCP-1/chemokine (C-C motif) receptor type (CCR)2 and ILK Serine 246 was upregulated in the endometriotic tissue of endometriosis in patients. Using co-immunoprecipitation and molecular docking studies, we confirmed ILK interaction with CCR2 under a high MCP-1 level in Hs832(C).TCs (human endometriotic cells). Targeting ILK by CDP22 (20mg/kg) suppresses endometriosis progression and altered the pregnancy outcome in the mouse model. Our *in-silico* study suggest that CPD22 inhibits the Ser^{246} phosphorylation of ILK. The ILK induced the inflammatory genes in the mouse model as reported in human (**Life Sci. 2024 Sep 15;353:122902 PMID: 39004271**). In conclusion, MCP-1 activates ILK at S^{246} residue, leading to lesion development/progression and the inflammatory response, reflecting the therapeutic importance of ILK for endometriosis management through the mouse model.

9.5 PARP-2 is Dysregulated in the Endometriosis and Pharmacological Inhibition of PARP-2 Regressed the Endometriotic Lesion in the Mouse Model

Poly(ADP-robose)polymerase (PARP-1 and -2) is essential for the endometrial receptivity during embryo implantation. However, report showed that PARP is dysregulated in the endometriosis in the serum and peritoneal regions. We found that PARP member PARP-2 is increased in the endometriotic tissue in human and mouse models. The endometriotic lesion is reduced by the PARP-2 inhibition in the mouse model. PARP-2 inhibitor also reduced the cell aggregation potential in the human endometriosis cells and affected the ILK signaling and reduced the inflammatory response in the mouse model and human endometriotic cells. This particular study points a dysregulated PARP-2 as one of the endometriosis associated molecule; however, it target validation requires further studies. (**Biochem Biophys Res Commun. 2025 Mar 25;754:151509., PMID: 40036901**).

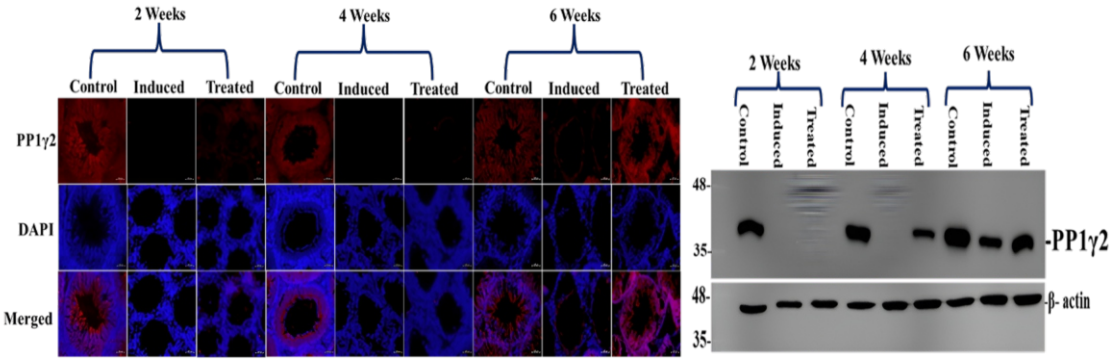

Figure 5: PP1γ2 is a sperm-specific protein and plays a crucial role in sperm maturation. Expression of PP1γ2 reduced drastically in the chemo-ablated animals and reappeared within four weeks of MSCs treatment; its expression increased further within six weeks of treatment. (Original magnification was 200X)

9.6 Authentication of Stem Cell Therapy through the Germ Cell Maturation Marker PP1γ2 to Restore Dysfunctional Testes

Infertility is a significant health issue for men worldwide, often caused by factors such as chemotherapeutic drugs that have gonadotoxic effects. Bone marrow serves as a valuable source of mesenchymal stem cells (MSCs) due to its accessibility and immunological compatibility. This study explores the restoration of gonadal function through the transplantation of enriched and purified bone marrow-derived MSCs in males with infertility. An infertile rodent model was created by inducing gonadal dysfunction through chemotherapy. Stem cell therapy shows promise for treating this condition, as MSCs can self-renew and differentiate into multiple cell types. After establishing the model, MSCs were isolated from bone marrow and enriched in specific culture media, and their purity was assessed via FACS analysis. The purified MSCs were then transplanted into the testes of the chemo-ablated animals. After MSC treatment, their testes were collected at various time points following MSC transplantation. Restoration of dysfunctional testes through stem cell therapy was evaluated by the expression of PP1γ2. PP1γ2 is abundantly expressed in the testis and plays a crucial role in sperm maturation and the regulation of sperm motility. It also contributes to the morphogenesis of the sperm tail. In the immunofluorescence analysis, the expression of PP1γ2 was found to be upregulated within two and four weeks, whereas a significant increase in the expression was observed by six weeks, as compared to chemo-ablated animals. In the immunoblotting analysis, the expression of PP1γ2 was drastically reduced in the chemo-ablated animals but reappeared within four weeks of MSC treatment. Its expression continued to increase further after six weeks of treatment. These findings authenticate the potential of regenerative medicine through stem cell therapy to rejuvenate the dysfunctional testes.

Section
II

Research Outputs

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improved breast cancer therapy
Pratiksha Tiwari [1], Ravi Prakash Shukla [2], Krishna Yadav [2], Neha Singh [2], Disha Marwaha [2], Shalini Gautam [2], Avijit Kumar Bakshi [2], Nikhil Rai [2], Ankit Kumar [2], Deepak Sharma [2], Prabhat Ranjan Mishra [3]
Affiliations + expand
PMID: 37935257 DOI: 10.1016/j.jconrel.2023.11.005
Abstract
Imprecise targeting of chemotherapeutic drugs often leads to severe
therapy. To address this issue, we have devised a strategy
carbon quantum dots (CQDs), which are subse
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Metabolism. 2024 Mar:152:155771. doi: 10.1016/j.metabol.2023.155771. Epub 2024 Ja
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Journal of Controlled Release
Volume 372, August 2024, Pages 331-346
Alendronate-functionalized porous nano-crystalsomes mitigate osteolysis and consequent inhibition of tumor growth in a tibia-induced metastasis model
Ravi Prakash Shukla [a 1], Pratiksha Tiwari [a], Anirban Sardar [b c], Sandeep Urandur [a], Shalini Gautam [a], Disha Marwaha [a], Ashish Kumar Tripathi [b], Nikhil Rai [a], Ritu Trivedi [b c], Prabhat Ranjan Mishra [a c]
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ach using an Alendronate (ALN) fun
Nucleic Acids Res. 2024 Dec 11;52(22):13996-14012. doi: 10.1093/nar/gkae1130.
Bacterial Rps3 counters oxidative and UV stress by recognizing and processing AP–sites on mRNA via a novel mechanism
Mohammad Afsar [1], Ankita Shukla [1], Faiz Ali [1 2], Rahul Kumar Maurya [3], Suman Bharti [3], Nelam Kumar [1], Mohammad Sadik [1], Surabhi Chandra [4], Huma Rahil [4], Sanjay Kumar [1], Imran Ansari [1], Farheen Jahan [1 2], Saman Habib [1 2], Tanweer Hussain [4], Manju Yasoda Krishnan [3 2], Ravishankar Ramachandran [1 2]
Affiliations + expand
PMID: 39588766 PMCID: PMC11662941 DOI: 10.1093/nar/gkae1130
Abstract
Lesions and stable secondary structures
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LYMPHOMA
Targeting CERS6-AS1/FGFR1 axis as synthetic vulnerability to constrain stromal cells supported proliferation in Mantle cell lymphoma
ndal, Mukesh Mamgain
ar Nath, Isha Sharma, Bhaskar Pant, Ankita Sharma, Arch
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Gupta, Sanjeev Kumar, Shailendra Prasad Verma,
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Journal of Controlled Release
Volume 372, August 2024, Pages 234-250
Regeneration capability of neonatal lung-derived decellularized extracellular matrix in an emphysema model
Kusum Devi [a c], Manendra Singh Tomar [b], Mohit Barsain [a], Ashutosh Shrivastava [b], Baisakhi Moharana [a c]
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Highlights

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G, Yadav KS, Verma S, Sharma RK, Se
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1 Publications

LIST OF PUBLICATIONS (2023)

(Not included in the previous year Annual Report due to incomplete Citation)

1. Azeem MZ, Dubey MS, Islam MSA and Mandal PK. An Open-Air Palladium-Catalyzed Stereoselective O-Glycosylation of Glycals *via In-situ* Generation of gem-Disubstituted Methanols from p-Quinone Methides. **Chemistry: An Asian Journal 19(4), e202301013.**
2. Gaurav A, Azeem Z and Mandal PK. Tris(pentafluorophenyl)borane-Catalyzed Stereoselective C -Glycosylation of Glycals: A Facile Synthesis of Allyl and Alkynyl Glycosides. **Synthesis-Stuttgart 56(6), 1026-1034.**
3. Kumar A, Rana R, Saklani R, Kumar M, Yadav PK, Tiwari A and Chourasia MK. Technology Transfer of a Validated RP-HPLC Method for the Simultaneous Estimation of Andrographolide and Paclitaxel in Application to Pharmaceutical Nanoformulation. **Journal of Chromatographic Science 62(4), 356-363.**
4. Lavekar AG, Thakare R, Saima, Equbal D, Chopra S and Sinha AK. Indole-Based Aryl Sulfides Target the Cellwall of *Staphylococcus aureus* without Detectable Resistance. **Drug Development Research 85(1), e22123.**
5. Maurya P, Rawat RS, Gupta S, Krishna S, Siddiqi MI, Sashidhara KV and Banerjee D. Synergy between Human DNA Ligase I and Topoisomerase I Unveils New Therapeutic Strategy for the Management of Colorectal Cancer. **Journal of Biomolecular Structure and Dynamics 43(7), 3390-3405.**
6. Padmesh S, Singh A, Chopra S, Sen M, Habib S, Shrivastava D and Johri P. Isolation and Characterization of Novel Lytic Bacteriophages that Infect Multi-drug Resistant Clinical Strains of *Escherichia coli*. **Environmental Science and Pollution Research 31(46), 57327-57337.**
7. Pal S, Sharma S, Porwal K, Tiwari MC, Khan YA, Kumar S, Kumar N and Chattopadhyay N. The Role of Osteogenic Effect and Vascular Function in Bone Health in Hypertensive Rats: A Study of Anti-hypertensive and Hemorheologic Drugs. **Calcified Tissue International 114(3), 295-309.**
8. Parwez S, Mahapatra PP, Ahmed S and Siddiqi MI. Identification of Novel TACE Inhibitors using DNN Based-Virtual Screening, Molecular Dynamics and Biological Evaluation. **Journal of Biomolecular Structure and Dynamics 42(11), 5869-5880.**
9. Piryaei F, Mehta P, Mozdarani H, Hamzehlooy F, Barati M, Piryaei Z, Gilani MAS, Alemi M and Singh R. Testicular piRNA Analysis Identified Dysregulated piRNAS in Non-obstructive Azoospermia. **Reproductive Sciences 31(5), 1246-1255.**
10. Rathore M, Das N, Ghosh N and Guha R. Insights on Discovery, Efficacy, Safety and Clinical Applications of Ghrelin Receptor Agonist Capromorelin in Veterinary Medicine. **Veterinary Research Communications 48(1), 1-10.**
11. Rawat P, Sharma K, Khanka S, Singh Y, Prakash R, Rais N, Maurya AK, Gupta R, Mishra DK, Singh D and Kanojiya S. Bone Fracture-healing Properties and UPLC-MS Analysis of an Enriched Flavonoid Fraction from *Oxystelma esculentum*. **Planta Medica 90(2), 96-110.**
12. Samreen, Ahmad I, Siddiqui SA, Naseer A and Nazir A. Efflux Pump Inhibition-Based Screening and Anti-Infective Evaluation of *Punica granatum* Against Bacterial Pathogens. **Current Microbiology 81(1), 51.**
13. Sanyal S, Rajput S, Sadhukhan S, Rajender S, Mithal A and Chattopadhyay N. Polymorphisms in the Runx2 and Osteocalcin Genes Affect BMD in Postmenopausal Women: A Systematic Review and Meta-analysis. **Endocrine 84(1), 63-75.**
14. Singh SK, Sharma G, Singh P, Shukla SK, Kanojiya S and Mishra DK. Effect of Methyl Jasmonate and Salicylic Acid on the Enrichment of Carbazole Alkaloids in *Murraya koenigii* (L.) Spreng. **Journal of Plant Growth Regulation 43(9), 3192-3203.**
15. Sinha K, Parwez S, Shahana M, Yadav A, Siddiqi MI and Banerjee D. Machine Learning and Biological Evaluation-Based Identification of a Potential MMP-9 Inhibitor, Effective Against Ovarian Cancer Cells SKOV3. **Journal of Biomolecular Structure and Dynamics 2(13), 6823-6841.**
16. Soni M, Srivastava G, Ramalingam K, Shakya AK, Siddiqi MI and Pratap JV. Identification of Potent Inhibitors for *Leishmania donovani* Homoserine Kinase: An Integrated *In silico* and Kinetic Study. **Journal of Biomolecular Structure and Dynamics 42(24), 13923-13938.**

LIST OF PUBLICATIONS 2024

1. Abhishek Shah A, Chand D, Ahamad S, Porwal K, Chourasia MK, Mohanan K, Srivastava KR and Chattopadhyay N. Therapeutic Targeting of Wnt Antagonists by Small Molecules for Treatment of Osteoporosis. **Biochemical Pharmacology 230(Pt 2), 116587.**
2. Ade M, Sahoo D, Singh V, Saxena A, Shukla SK and Yadav NP. Development and Characterization of Fennel Oil-loaded Alginate Polymeric Beads for Larvicidal Activity Against *Aedes agypti*, *Anopheles stephensi*, and Wild Mosquito

Larvae. **Industrial Crops and Products 220, 119154.**

3. Adhikari AS and Majumdar N. Catalytic Asymmetric Ring Opening Reactions of Vinylcyclopropanes. **European Journal of Organic Chemistry 27(19), e202301225.**

4. Afsar M, Shukla A, Ali F, Maurya RK, Bharti S, Kumar N, Sadik M, Chandra S, Rahil H, Kumar S, Ansari I, Jahan F, Habib S, Hussain T, Krishnan MY and Ramachandran R. Bacterial Rps3 Counters Oxidative and UV Stress by Recognizing and Processing AP-sites on mRNA *via* a Novel Mechanism. **Nucleic Acids Research 52(22), 13996-14012.**

5. Agarwal A, Dadge S, Garg R, Sharma RK, Chauhan D, Katekar R, Rathaur S, Mitra K and Gayen JR. Bioavailability Enhancement of Formononetin by Incorporation of Natural Bioenhancer in Phospholipid Complex. **Pharmaceutical Development and Technology 29(10), 1148-1161.**

6. Agarwal A, Wahajuddin M, Chaturvedi S, Singh SK, Rashid M, Garg R, Chauhan D, Sultana N and Gayen JR. Formulation and Characterization of Phytosomes as Drug Delivery System of Formononetin: An Effective Anti-Osteoporotic Agent. **Current Drug Delivery 21(2), 261-270.**

7. Aggarwal H, Gautam J, Gupta SK, Das B, Kumar Y, Jagavelu K and Dikshit M. Improved Metabolic Stability in iNOS Knockout Mice with *Lactobacillus* Supplementation. **Nutrition Research 132, 95-111.**

8. Ahammed B and Kalangi SK. A Decade of Organoid Research: Progress and Challenges in the Field of Organoid Technology. **ACS Omega 9(28), 30087-30096.**

9. Ahmad A, Kumar M, Rastogi A, Khan R, Gangwar MK and Koley D. Directing Group Guided Site-Selective Alkylation of Indoles by Epoxides: Synthesis of β-Indolylethyl Alcohol Derivatives. **Advanced Synthesis & Catalysis 366(21), 4416-4421.**

10. Ahmad M, Fatma L, Kant R and Mohanan K. Reagent- and Solvent-controlled Product Divergence in the Reaction of Trifluorodiazoethane with Arylidene-1,3-indanediones. **Journal of Fluorine Chemistry 274, 110256.**

11. Ahmed S, Mital A, Akhir A, Saxena D, Jahan K, Dubey G, Bharatam PV, Dasgupta A, Chopra S and Jain R. Pyrrole-Thiazolidin-4-one Analogues Exhibit Promising Anti-Tuberculosis Activity. **Asian Journal of Organic Chemistry 13(6), e202400054.**

12. Akbar M, Toppo P and Nazir A. Ageing, Proteostasis, and the Gut: Insights into Neurological Health and Disease. **Ageing Research Reviews 101, 102504.**

13. Akhtar S, Ansari MM, Verma RD, Sharma J, Gupta A, Dhuriya RK, Verma DP, Saroj J, Ali M, Verma NK, Mitra K, Singh BN and Ghosh JK. Generating a Peptide Library Using the Repeats of Amino Acid Scaffolds Created by Sliding the Framework of a 7-mer Human Chemerin Segment and Discovery of Potent Antibacterial and Antimycobacterial Peptides. **Journal of Medicinal Chemistry 68(1), 566-589.**

14. Ali M, Gupta A, Verma RD, Akhtar S and Ghosh JK. A Peptide Derived from the Amino Terminus of Leptin Improves Glucose Metabolism and Energy Homeostasis in Myotubes and db/db Mice. **Journal of Biological Chemistry 300(12), 107919.**

15. Ali M, Kumari T, Gupta A, Akhtar S, Verma RD and Ghosh JK. Identification of a 10-mer Peptide from the Death Domain of MyD88 Which Attenuates Inflammation and Insulin Resistance and Improves Glucose Metabolism. **Biochemical Journal 481(4), 191-218.**

16. Ali R, Sen S, Hameed R, Nazir A and Verma S. Strategies for Gaseous Neuromodulator Release in Chemical Neuroscience: Experimental Approaches and Translational Validation. **Journal of Controlled Release 365, 132-160.**

17. Anand A, Gautam G, Srivastava G, Yadav S, Ramalingam K, Siddiqi MI and Goyal N. Molecular, Structural, and Functional Characterization of delta Subunit of T-complex Protein-1 from *Leishmania donovani*. **Infection and Immunity 92(10), e0023424.**

18. Anand A, Gautam G, Yadav S, Ramalingam K, Kumar Haldar A and Goyal N. Epsilon Subunit of T-complex Protein-1 from *Leishmania donovani*: A Tetrameric Chaperonin. **Gene 926, 148637.**

19. Arora M, Mehta P, Sethi S, Anifandis G, Samara M and Singh R. Genetic Etiological Spectrum of Sperm Morphological Abnormalities. **Journal of Assisted Reproduction and Genetics 41(11), 2877-2929.**

20. Arya CG, Kishore R, Gupta P, Gondru R, Arockiaraj J, Pasupuleti M, Chandrakanth M, Punya VP and Banothu J. Identification of Coumarin - Benzimidazole Hybrids as Potential Antibacterial Agents: Synthesis, *In vitro* and *In vivo* Biological Assessment, and ADMET Prediction. **Bioorganic & Medicinal Chemistry Letters 110, 129881.**

21. Arya S, Verma S, Aman R, Purkait B, Panthari D and Dobriyal V. Pharmacologically significant Penta, Hexa, and Heptacoordinate Mono Organosilicon (IV) Schiff Base Complexes Derived from Phenyl Alanine: Synthesis, Spectral Characterization, Antimicrobial, Antioxidant, Anti-inflammatory, and Anti-diabetic Studies. **Journal of the Indian Chemical Society 101(10), 101319.**

22. Ayaz MO, Bhat AQ, Akhter Z, Badsera N, Hossain MM, Showket F, Parveen S, Dar MS, Tiwari H, Kumari N, Bhardwaj M, Hussain R, Sharma A, Kumar M, Singh U, Nargorta A, Kshatri AS, Nandi U, Monga SP, Ramajayan P, Singh PP and Dar MJ. Identification of a Novel GSK3β Inhibitor Involved in Abrogating KRas Dependent Pancreatic Tumors in Wnt/beta-catenin and NF-kβ Dependent Manner. **Life Sciences 351, 122840.**

23. Azeem Z, Dubey S and Mandal PK. Pd-Catalyzed Synthesis of 1-(Hetero)aryl Thioglycosides: Strategy for the Trapping of an Acyl Group of Glycosylthioesters by Coupling of Bis-Electrophilic-Nucleophilic Partners. **Journal of Organic Chemistry 89(21), 15777-15792.**

24. Azeem Z, Maurya S, Ovais M, Sangwan R, Dubey A and Mandal PK. Emerging Advances in Transition Metal-Catalyzed C-H Bond Functionalizations Towards C-Glycosides. **Current Organic Chemistry 29(6), 423-454.**

25. Baghel R, Chhikara N, Kumar P and Tamrakar AK. SGLT2 Inhibitors for the Treatment of Diabetes: A Patent Review (2019-23). **Expert Opinion on Therapeutic Patents 34(9), 807-823.**

26. Bakchi B, Maddipatla S, Gottemukkala S, Raut S, Ahmad MN, Imran M, Saxena D, Maitra R, Agnivesh PK, Kalia NP, Nanduri S, Dasgupta A, Chopra S and Yaddanapudi VM. Benzyl/phenyl-1,2,3-Triazole Tethered 3-Acetyl Coumarins as Potential Drug-Resistant Antitubercular Agents: Synthesis, Biology, and *In Silico* Investigations as Mtb DNA Gyrase Inhibitors. **ChemistrySelect 9(39), e202402316.**

27. Bakchi B, Maddipatla S, Gupta K, Singampalli A, Saxena D, Maitra R, Agnivesh PK, Kalia NP, Nanduri S, Chopra S and Yaddanapudi VM. Facile One-pot Synthesis of N-pyridinylaminonaphthol Derivatives and Their Antibacterial Evaluation Against Multidrug-Resistant *Staphylococcus aureus*. **Archiv Der Pharmazie 357(11), e2400358.**

28. Bano A, Madan M, Joshi A, Shukla RK and Tripathi V. Establishment of Regeneration and Stable Transformation Protocol for *Eclipta prostrata* (L.) L: A Significant Herb of Indian Traditional Medicinal System. **Plant Cell, Tissue and Organ Culture (PCTOC) 159(3), 61.**

29. Bano N, Khan S, Ahamad S, Kanshana JS, Dar NJ, Khan S, Nazir A and Bhat SA. Microglia and Gut Microbiota: A Double-edged Sword in Alzheimer's Disease. **Ageing Research Reviews 101, 102515.**

30. Barman D, Bhattacharjee K and Jha DK. Assessment of Soil Bacterial Community Compositions by Structural-Functional Genomics and Soil Edaphic Factors Largely Explain the Impact of Coal Mining. **Water, Air, & Soil Pollution 235(5), 314.**

31. Bhadkaria A, Mehta P, Mittal M, Mithal A, Gupta SK, Rajender S and Chattopadhyay N. Assessment of Maternal Adaptive Changes in Vitamin D and Calcium Metabolism during Pregnancy through a Systematic Review and Meta-Analysis. **Journal of Biological Regulators and Homeostatic Agents 38(3), 1901-1917.**

32. Bhale NA, Shah S, Jahnavi AS, Vishwakarma A, Thakur TS, Thomas SP, Srivastava S and Dikundwar AG. Three Strikingly Different Crystal Habits of Tadalafil: Design, Characterization, Pharmaceutical Performance, and Computational Studies. **Molecular Pharmaceutics 21(12), 6234-6244.**

33. Bhatt D, Washimkar KR, Kumar S, Mugale MN, Pal A and Bawankule DU. Naringin and Chloroquine Combination Mitigates Chloroquine-resistant Parasite-induced Malaria Pathogenesis by Attenuating the Inflammatory Response. **Phytomedicine 133, 155943.**

34. Bhumij M, Ambule MD, Sinha S, Prabhat S, Kant R and Srivastava AK. Enantioselective Synthesis of Azatricycles *via* Post-Ugi Cyclizations. **Journal of Organic Chemistry 89(22), 16679-16696.**

35. Bisen AC and Bhatta RS. Ocular Bioanalysis of Moxifloxacin and Ketorolac Tromethamine in Rabbit Lacrimal Matrix using Liquid Chromatography-tandem Mass Spectrometry. **Bioanalysis 16(4), 219-232.**

36. Bisen AC, Agrawal S, Rayiti R, Sanap SN, Biswas A, Mishra A, Gupta NM and Bhatta RS. Pirfenidone: A Promising Drug in Ocular Therapeutics. **Chemistry & Biodiversity 21(3), e202301389.**

37. Bisen AC, Dubey A, Agrawal S, Biswas A, Rawat KS, Srivastava S and Bhatta RS. Recent Updates on Ocular Disease Management with Ophthalmic Ointments. **Therapeutic Delivery 15(6), 463-480.**

38. Bisen AC, Mishra A, Agrawal S, Sanap SN, Biswas A, Verma SK and Bhatta RS. Codetermination of Antimicrobial Agents in Rabbit Tear Fluid using LC-MS/MS Assay: Insights into Ocular Pharmacokinetic Study. **Journal of Mass Spectrometry 59(6), e5031.**

39. Bisen AC, Sanap SN, Agrawal S, Biswas A, Mishra A, Verma SK, Singh V and Bhatta RS. Etiopathology, Epidemiology, Diagnosis, and Treatment of Fungal Keratitis. **ACS Infectious Diseases 10(7), 2356-2380.**

40. Bisen AC, Srivastava S, Mishra A, Sanap SN, Biswas A, Choudhury AD, Dubey A, Gupta NM, Yadav KS, Mugale MN and Bhatta RS. Pharmaceutical Emulsions: A Viable Approach for Ocular Drug Delivery. **Journal of Ocular Pharmacology and Therapeutics 40(5).**

41. Bisht VS, Kumar D, Najar MA, Giri K, Kaur J, Prasad TSK and Ambatipudi K. Drug Response-Based Precision Therapeutic Selection for Tamoxifen-resistant Triple-positive Breast Cancer. **Journal of Proteomics 310, 105319.**

42. Biswas A, Choudhury AD, Agrawal S, Bisen AC, Sanap SN, Verma SK, Kumar M, Mishra A, Kumar S, Chauhan M and Bhatta RS. Recent Insights into the Etiopathogenesis of Diabetic Retinopathy and Its Management. **Journal of Ocular Pharmacology and Therapeutics 40(1), 13-33, 68.**

43. Biswas A, Choudhury AD, Mishra A, Verma SK, Bisen AC, Sanap SN, Agrawal S, Kumar M, Kumar S and Bhatta RS.

Pharmacokinetic Analysis of Gatifloxacin and Dexamethasone in Rabbit Ocular Biofluid Using a Sensitive and Selective LC-MS/MS Method. **Journal of Mass Spectrometry 59(10), e5088.**

44. Biswas A, Kumar S, Choudhury AD, Bisen AC, Sanap SN, Agrawal S, Mishra A, Verma SK, Kumar M and Bhatta RS. Polymers and Their Engineered Analogues for Ocular Drug Delivery: Enhancing Therapeutic Precision. **Biopolymers 115(4), e23578.**

45. Cannarella R, Mehta P, Garofalo V, Kaiyal RS, Kuroda S, Calogero AE and Rajender S. Resveratrol and Male Infertility: A Systematic Review of the Literature. **Minerva Endocrinology.**

46. Cannarella R, Shah RP, Ko ED, Kavoussi P, Rambhatla A, Hamoda TAAAM, Saleh R, Harraz AM, Calogero AE, Durairajanayagam D, Toprak T, Calik G, Crafa A, Gunes S, Gherabi N, Kuroda S, Kandil H, Gül M, Boitrelle F, Ghayda RA, Kosgi R, Karthikeyan VS and Russo GI. Effects of Varicocele Repair on Testicular Endocrine Function: A Systematic Review and Meta-Analysis. **The World Journal of Men's Health 42, e92.**

47. Cannarella R, Shah RP, Saleh R, Boitrelle F, Hamoda, TAAAM, Singh R, Salvio G, Toprak T, Falcone M, Gul M, Dimitriadis F, Rambhatla A, Russo GI, Ko ED, Zini A, Kavoussi P, Phuoc NHV, Kandil H, Abou Ghayda R, Birowo P, Gherabi N, Ceyhan E, Dong J. and Malhotra. Effects of Varicocele Repair on Sperm DNA Fragmentation and Seminal Malondialdehyde Levels in Infertile Men with Clinical Varicocele A Systematic Review and Meta-Analysis. **The World Journal of Men's Health 42(2), 321-337.**

48. Chaitanya KS, Gupta P, Chitti S, Khetmalis YM, Chandu A, Murugesan S, Pasupuleti M and Sekhar KVGC. Development and Biological Evaluation of Novel Spiro 4-Chromanones as Potent Quorum Sensing Inhibitors. **Journal of Chemistry 2024, 8227205.**

49. Chakradhar JVUS, Kothuri N, Singh S, Verma S, Shafi H, Reddy DVS, Kedar A, Rana R, Mishra K, Sharma D and Chourasia MK. A Quality by Design Approach for Developing SNEDDS Loaded with Vemurafenib for Enhanced Oral Bioavailability. **AAPS PharmSciTech 25(1), 14.**

50. Chakravarti B, Rajput S, Srivastava A, Sharma LK, Sinha RA, Chattopadhyay N and Siddiqui JA. A Systematic Review and Meta-Analysis of the Effects of Dietary Isoflavones on Female Hormone-Dependent Cancers for Benefit-Risk Evaluation. **Phytotherapy Research 38(12), 6062-6081.**

51. Chatterjee T, Tiwari A, Gupta R, Shukla H, Varshney A, Mishra S and Habib S. A *Plasmodium* Apicoplast-targeted Unique Exonuclease/FEN Exhibits Interspecies Functional Differences Attributable to an Insertion that Alters DNA-binding. **Nucleic Acids Research 52(13), 7843-7862.**

52. Chaudhary D and Kuram MR. Hexafluoroisopropanol (HFIP)-Mediated Intramolecular Cyclization of Allenamides to Access C1-Vinyl Tetrahydro-β-carbolines. **Journal of Organic Chemistry 89(16), 11783-11788.**

53. Chaudhary D and Kuram MR. Regio- and Stereoselective Hexafluoroisopropoxylation and Trifluoroethoxylation of Allenamides. **Journal of Organic Chemistry 89(10), 7347-7351.**

54. Chauhan A, Patel RK, Yadav A, Kant R and Kumar R. Anion-Relay Double Aza-Michael-Michael Cascades to Enone-Tethered Cyclohexadienones: Access to an Intricate Bridged Ring System. **Organic Letters 26(27), 5602-5608.**

55. Chauhan D, Dadge S, Yadav PK, Sultana N, Agarwal A, Vishwakarma S, Rathaur S, Yadav S, Chourasia MK and Gayen JR. LC-MS/MS Method for Simultaneous Estimation of Raloxifene, Cladrin in Rat Plasma: Application in Pharmacokinetic Studies. **Bioanalysis 16(3), 141-153.**

56. Chauhan D, Maity D, Yadav PK, Vishwakarma S, Agarwal A, Chourasia MK and Gayen JR. Enhanced Oral Bioavailability of Levormeloxifene and Raloxifene by Nanoemulsion: Simultaneous Bioanalysis using Liquid Chromatography-tandem Mass Spectrometry. **Nanomedicine 19(12), 1051-1068.**

57. Chauhan D, Yadav PK, Sultana N, Agarwal A, Verma S, Chourasia MK and Gayen JR. Advancements in Nanotechnology for the Delivery of Phytochemicals. **Journal of Integrative Medicine 22(4), 385-398.**

58. Chauhan M, Kumar S, Biswas A, Kumar M, Verma SK, Mishra A, Singh V, Bisen AC, Agrawal S, Choudhury AD, Rayiti R and Bhatta RS. A Comprehensive Review of the Advancement in Omic Technologies in the Field of Drug Discovery and Development. **Letters in Drug Design & Discovery 21(16), 3319-3331.**

59. Chauhan NS and Mandal PK. Palladium-Catalysed Norbornene-Mediated Regioselective Direct C-H Glycosylation of Free (N-H) Pyrrole Derivatives. **Advanced Synthesis & Catalysis 366, 1291-1297.**

60. Choudhary S, Mandal A, Patra A, Kant R and Ghosh N. Copper/Zinc-Catalyzed Stitching of 2-Carbonylanilines with Bis(ynamides): Access to Pyrrolo[2,3-b]quinolines and Its Photophysical Studies. **Journal of Organic Chemistry 89(9), 6274-6280.**

61. Dadge SD, Yadav S, Rathaur S and Gayen JR. LC-ESI-MS/MS Method Validation for Simultaneous Quantification of FDA-approved Anticancer Agents Futibatinib and Binimetinib in Rat Plasma: Insights from Preclinical Pharmacokinetics. **Biomedical Chromatography 38(11), e6005.**

62. Darmadi D, Pakpahan C, Singh R, Saharan A, Pasaribu WS, Hermansyah H and Rezano A. Inflammatory Bowel Disease (Ulcerative Colitis Type) Severity Shows Inverse Correlation with Semen Parameters and Testosterone Levels. **Asian Journal of Andrology 26(2), 155-159.**

63. Das A, Nikhil A, Yadav B, Jagavelu K and Kumar A. Thermoresponsive Polymer Encapsulated HT1080 Exosomes Lyse Localized Blood Clot: A Preclinical Evaluation in Rat Carotid Artery Thrombosis Model. **Journal of Drug Delivery Science and Technology 98, 105828.**

64. Das N, Rathore M and Guha R. A Meta-analysis and Systematic Review on Adipokines as Potential Biomarker for Proliferative Diabetic Retinopathy. **International Journal of Diabetes in Developing Countries.**

65. Das R, Arora R, Nadar K, Saroj S, Singh AK, Patil SA, Raman SK, Misra A and Bajpai U. Insights into the Genomic Features and Lifestyle of B1 Subcluster Mycobacteriophages. **Journal of Basic Microbiology 64(6), e2400027.**

66. Das T, Kumar P, Kumar S, Mal S, Kumar S, Rajana VK, Singh S, Dasgupta A, Mandal D and Das S. Design, Synthesis, and Biological Studies of C-5-Substituted Diazenyl Derivatives of Uracil as Potent and Selective Antileishmanial Agents Targeting Uridine Biosynthesis Pathway Enzymes. **ACS Infectious Diseases 10(12), 4313-4326.**

67. Dave R, Jaiswal A, Naseer A, Tripathi A, Patel M, Verma S, Dubey KD, Nazir A and Gour N. Amyloid-like Aggregation Propensities of Metabolites - Homogentisic Acid, N-Acetyl Aspartic Acid and Isovaleric acid. **ChemBioChem 25(23), e202400109.**

68. De I, Singh R, Kumar S, Singh S, Singh M, Panda JJ, Ghosh K, Mishra DP and Singh M. Short Term Biodistribution and *In vivo* Toxicity Assessment of Intravenously Injected Pristine Graphene Oxide Nanoflakes in SD Rats. **Toxicology Research 13(2), tfae058.**

69. Devi K, Tomar MS, Barsain M, Shrivastava A and Moharana B. Regeneration Capability of Neonatal Lung-derived Decellularized Extracellular Matrix in an Emphysema Model. **Journal of Controlled Release 372, 234-250.**

70. Devireddy VSR, Shafi H, Verma S, Singh S, Chakradhar JVUS, Kothuri N, Bansode H, Raman SK, Sharma D, Azmi L, Verma RK and Misra A. Comparative Preclinical Pharmacokinetics and Disposition of Favipiravir Following Pulmonary and Oral Administration as Potential Adjunct Therapy Against Airborne RNA Viruses. **Pharmaceutical Research 41(11), 2189-2198.**

71. Dhami A, Chandrasekharan SP and Mohanan K. BF(3)-Mediated C2-Amidation of Quinoline N-Oxides Employing Trifluorodiazoethane and Acetonitrile: Access to 2-N-(Trifluoroethyl)amidoquinolines. **Organic Letters 27(1), 80-85.**

72. Dhami A, Kumar A, Hisana KN and Mohanan K. Organocatalyzed, Three-Component Construction of Cyanopyrazoles Using Diazoacetonitrile. **Advanced Synthesis & Catalysis 366, 2551-2556.**

73. Dubey S, Azeem Z and Mandal PK. Emerging Advances of the Radical Pathway Glycosylation Enabled by Bench-Stable Glycosyl Donors: Glycosyl Sulfoxides, Glycosyl Sulfones, and Glycosyl Sulfinates. **Advanced Synthesis & Catalysis 366(19), 4017-4041.**

74. Duggal S, Sharma S, Rai N, Chauhan D, Upadhyay V, Srivastava S, Porwal K, Kulkarni C, Trivedi AK, Gayen JR, Mishra PR, Chattopadhyay N and Pal S. Anti-Microbial Drug Metronidazole Promotes Fracture Healing: Enhancement in the Bone Regenerative Efficacy of the Drug by a Biodegradable Sustained-Release *In Situ* Gel Formulation. **Biomedicines 12(7), 1603.**

75. Dutta M, Qamar T, Kushavah U, Siddiqi MI and Kar S. Exploring Host Epigenetic Enzymes as Targeted Therapies for Visceral Leishmaniasis: *In silico* Design and *In vitro* Efficacy of KDM6B and ASH1L Inhibitors. **Molecular Diversity 28(6), 4403-4424.**

76. Ghosh A, Mishra A, Devi R, Narwal SK, Nirdosh, Srivastava PN and Mishra S. A Micronemal Protein, Scot1, Is Essential for Apicoplast Biogenesis and Liver Stage Development in *Plasmodium berghei*. **ACS Infectious Diseases 10(8), 3013-3025.**

77. Ghosh A, Upadhyay S, Dahatonde DJ, Kant R and Batra S. Lewis Acid-mediated Modular Route to the Synthesis of 3-Substituted Quinolines from 2-Aminobenzyl Alcohols and Enamine(one)s. **New Journal of Chemistry 48(15), 6902-6910.**

78. Ghosh A, Varshney A, Narwal SK, Nirdosh, Gupta R and Mishra S. The Novel *Plasmodium berghei* Protein S14 is Essential for Sporozoite Gliding Motility and Infectivity. **Journal of Cell Science 137(11), jcs261857.**

79. Gulzar F, Chhikara N, Kumar P, Ahmad S, Yadav S, Gayen JR and Tamrakar AK. ER Stress Aggravates NOD1-Mediated Inflammatory Response Leading to Impaired Nutrient Metabolism in Hepatoma cells. **Biochemical and Biophysical Research Communications 735, 150827.**

80. Gunjkar S, Gupta U, Nair R, Paul P, Aalhate M, Mahajan S, Maji I, Chourasia MK, Guru SK and Singh PK. The Neoteric Paradigm of Biomolecule-Functionalized Albumin-Based Targeted Cancer Therapeutics. **AAPS PharmSciTech 25(8), 265.**

81. Gupta A, Kumar A, Singh N, Patel M, Studitsky VM, Zhang KYJ and Akhtar MS. The Ser7 of RNA Pol II-CTD Influences the Recruitment of Cdc73 for mRNA Transcription. **International Journal of Biological Macromolecules 254(2), 127881.**

82. Gupta D, Singh S, Tiwari AK, Yadav PK, Sharma D, Mishra A, Kumar A, Bhatta RS, Kanojiya S, Mitra K, Narender T, Patil UK, Jain SK and Chourasia MK. Quantification of Arbortristoside-A Isolated from *Nyctanthes arbor-tristis* Using HPLC: Method Development and Pharmaceutical Applications. **Journal of Chromatography B: Analytical Technologies in the Biomedical and Life Sciences 1233, 123985.**

83. Gupta N, Yadav AK, Verma PK, Srivastava M, Sahasrabuddhe AA and Dube A. Differential Immune Responses of Th1 Stimulatory Chimeric Antigens of *Leishmania donovani* in BALB/c Mice. **ACS Infectious Diseases 10(12), 4246-4257.**

84. Hameed R, Naseer A, Saxena A, Akbar M, Toppo P, Sarkar A, Shukla SK and Nazir A. Functional Implications of NHR-210 Enrichment in *C. Elegans* Cephalic Sheath Glia: Insights into Metabolic and Mitochondrial Disruptions in Parkinson's Disease Models. **Cellular and Molecular Life Sciences 81(1), 202.**

85. Haridevamuthu B, Nayak SPRR, Madesh S, Dhivya LS, Chagaleti BK, Pasupuleti M, Rajakrishnan R, Alfarhan A, Kathiravan MK and Arockiaraj J. A Novel Brominated Chalcone Derivative as a Promising Multi-target Inhibitor Against Multidrug-resistant *Listeria monocytogenes*. **Microbial Pathogenesis 196, 106968.**

86. Hossain MM, Khalid A, Akhter Z, Parveen S, Ayaz MO, Bhat AQ, Badesra N, Showket F, Dar MS, Ahmed F, Dhiman S, Kumar M, Singh U, Hussain R, Keshari P, Mustafa G, Nargorta A, Taneja N, Gupta S, Mir RA, Kshatri AS, Nandi U, Khan N, Ramajayan P and Yadav G. Discovery of a Novel and Highly Selective JAK3 Inhibitor as a Potent Hair Growth Promoter. **Journal of Translational Medicine 22(1), 370.**

87. Imran M, Singh S, Ahmad MN, Malik P, Mukhopadhyay A, Yadav KS, Gupta UD, Mugale MN, Mitra K, Srivastava KK, Chopra S, Mignani S, Apartsin E, Majoral JP and Dasgupta A. Polycationic Phosphorous Dendrimer Potentiates Multiple Antibiotics Against Drug-resistant Mycobacterial Pathogens. **Biomedicine & Pharmacotherapy 173, 116289.**

88. Ishteyaque S, Singh G, Yadav KS, Verma S, Sharma RK, Sen S, Srivastava AK, Mitra K, Lahiri A, Bawankule DU, Rath SK, Kumar D and Mugale MN. Cooperative STAT3-NFkβ Signaling Modulates Mitochondrial Dysfunction and Metabolic Profiling in Hepatocellular Carcinoma. **Metabolism: Clinical and Experimental 152, 155771.**

89. Jaiswal A, Patel M, Naseer A, Kumari S, Revi N, Rengan A, Jain A, Nazir A, Gour N and Verma S. Amyloid Mimicking Assemblies Formed by Glutamine, Glutamic Acid, and Aspartic Acid. **ACS Chemical Neuroscience 15(11), 2253-2264.**

90. Jaiswal AK, Kushawaha AK, Katiyar S, Ansari A, Bhatt H, Kant R and Sashidhara KV. Silver-Catalyzed Synthesis of 5-Amino-4-sulfonyl Pyrazoles from 1,2-Diaza-1,3-dienes. **Journal of Organic Chemistry 89(21), 16033-16037.**

91. Jaiswal R, Bhati G, Ahmed S and Siddiqi MI. iDCNNPred: An Interpretable Deep Learning Model for Virtual Screening and Identification of PI3Kα Inhibitors Against Triple-negative Breast Cancer. **Molecular Diversity.**

92. Jha RK, Chhavi C, Jaiswal S, Parganiha D, Choudhary V, Saxena D, Maitra R, Singh S, Chopra S and Kumar S. Design, Synthesis, and Antibacterial Activities of Multi-functional C_2-Functionalized 1,4-Naphthoquinonyl Organoseleniums. **Chemistry: An Asian Journal 20(5), e202401054.**

93. Jindal U, Mamgain M, Nath UK, Sharma I, Pant B, Sharma A, Gupta A, Rahman K, Yadav S, Singh MP, Mishra S, Chaturvedi CP, Courty J, Singh N, Gupta S, Kumar S, Verma SP, Mallick S, Gogia A, Raghav S, Sarkar J, Srivastava KR, Datta D and Jain N. Targeting CERS6-AS1/FGFR1 Axis as Synthetic Vulnerability to Constrain Stromal Cells Supported Proliferation in Mantle Cell Lymphoma. **Leukemia 38(10), 2196-2209.**

94. Jose J, Yadav A and Tripathi CB. Photoinduced [4+2] Cycloaddition of Dienes and Quinonemethides. **Chemical Communications 60(80), 11315-11318.**

95. Kalugendo E, Nazir A and Agarwal R. Assessment of Azithromycin-Induced Toxicity in *Caenorhabditis elegans*: Effects on Morphology, Behavior, and Lipid Metabolism. **Toxicology Reports 13, 101832.**

96. Kanchan S, Marwaha D, Tomar B, Agrawal S, Mishra S, Kapoor R, Jha G, Sharma D, Bhatta RS, Mishra PR and Rath SK. Nanocarrier - Mediated Salinomycin Delivery Induces Apoptosis and Alters EMT Phenomenon in Prostate Adenocarcinoma. **AAPS PharmSciTech 25(5), 104.**

97. Kashyap K, Bhati G, Ahmed S and Siddiqi MI. Deep Convolutional Neural Network-Based Identification and Biological Evaluation of MAO-B Inhibitors. **International Journal of Biological Macromolecules 281(3), 136438.**

98. Katiyar S, Ahmad S, Kumar A, Ansari A, Bisen AC, Ahmad I, Gulzar F, Bhatta RS, Tamrakar AK and Sashidhara KV. Design, Synthesis, and Biological Evaluation of 1,4-Dihydropyridine-Indole as a Potential Antidiabetic Agent *via* GLUT4 Translocation Stimulation. **Journal of Medicinal Chemistry 67(14), 11957-11974.**

99. Kaushal SK, Parul, Tripathi A, Singh DP, Paul A, Alka K, Shukla S and Singh D. IL-33 Prevents Age-Related Bone Loss and Memory Impairment by Suppression of Th17 Response: Evidence in a d-Galactose-Induced Aging Mouse Model. **JBMR Plus 8(10), ziae101.**

100. Khan S, Bano N, Ahamad S, Dar NJ, Nazir A and Bhat SA. Advances in Nanotherapeutic Strategies for Huntington's

Disease: Design, Delivery, and Neuroprotective Mechanisms. **Coordination Chemistry Reviews 522, 216206.**

101. Khanam A, Tiwari A, Lal M, Dubey S, Kant R and Mandal PK. Metal-Free Substituent-Controlled Direct Synthesis of Unprecedented Iminotetrazoles *via* One-pot Ugi-Azide Reaction. **Asian Journal of Organic Chemistry 13(6), e202400048.**

102. Khanam A, Tiwari A, Ovais M, Lal M and Mandal PK. 3,4-Dicyano-2,5,6-Trifluorophenyl Glycosides as Electron-Deficient Fluoroarene Glycosyl Donors for Chemical Glycosylation. **Advanced Synthesis & Catalysis 367(3), e202401196.**

103. Khanikar S, Joshi P, Sharma A, Marpna LB, Sangma TRA, Browne RB, Kaping S, Helissey P, Tripathi R and Vishwakarma JN. Ultrasound-Assisted Synthesis and Structure Elucidation of Novel Quinoline-Pyrazolo[1,5-α]Pyrimidine Hybrids for Anti-Malarial Potential Against Drug-sensitive and Drug-resistant Malaria Parasites and Molecular Docking. **Journal of Chemical Sciences 136(4), 79.**

104. Khanka S, Somani C, Sharma K, Sharma S, Kumar A, Chattopadhyay N, Kanojiya SK, Yadav DK and Singh D. *Litsea glutinosa* Extract Promotes Fracture Healing and Prevents Bone Loss *via* BMP2/SMAD1 Signaling. **Journal of Endocrinology 261(2), e230351.**

105. Khatoon S, Das N, Chattopadhyay S, Joharapurkar A, Singh A, Patel V, Nirwan A, Kumar A, Mugale MN, Mishra DP, Kumaravelu J, Guha R, Jain MR, Chattopadhyay N and Sanyal S. Apigenin-6-C-Glucoside Ameliorates MASLD in Rodent Models *via* Selective Agonism of Adiponectin Receptor 2. **European Journal of Pharmacology 978, 176800.**

106. Koshta K, Chauhan A, Singh S, Gaikwad AN, Kumar M and Srivastava V. Altered Igf2 Imprint Leads to Accelerated Adipogenesis and Early Onset of Metabolic Syndrome in Male Mice Following Gestational Arsenic Exposure. **Chemosphere 352, 141493.**

107. Kothuri N, Verma S, Chakradhar JVUS, Singh S, Yadav P, Yadav PK, Kashyap A, Tiwari A, Sharma D and Chourasia MK. Simultaneous UHPLC-PDA Method Development and Validation for Quantification of Quercetin and Erlotinib in Liquid Crystalline Nanoparticle Formulation and Pharmacokinetic Study. **Chromatographia 87(10), 621-633.**

108. Kshatri A, Rivero-Pérez B and Giraldez T. Subunit-Specific Inhibition of BK Channels by Piperine. **Biophysical Journal 123(14), 1942-1953.**

109. Kulhari U, Ambujakshan A, Ahmed M, Washimkar K, Kachari J, Mugale MN and Sahu BD. Nuciferine Inhibits TLR4/NF-κβ/MAPK Signaling Axis and Alleviates Adjuvant-Induced Arthritis in Rats. **European Journal of Pharmacology 982, 176940.**

110. Kulhari U, Rajanan A, Ambujakshan A, Verma S, Mugale MN and Sahu BD. Biochanin A Mitigates Ulcerative Colitis and Intestinal Inflammation in Mice by Inhibiting MAPK/NF-κβ (p65) Axis. **Journal of Biochemical and Molecular Toxicology 38(6), e23738.**

111. Kumar A, Jaiswal AK, Kushawaha AK, Singh A, Kant R, Shukla SK and Sashidhara KV. A Metal-Free Amination of 1,2-Diaza-1,3-dienes Using Hydrazine Hydrate through N-N Bond Cleavage. **Asian Journal of Organic Chemistry 13(10), e202400169.**

112. Kumar D, Unnikrishnan U and Kuram MR. Facile Access to C-Substituted Piperazin-2-Ones and Mianserin Derivative Enabled by Chemoselective Carbene Insertion and Cyclization Cascade. **Chemical Communications 60(44), 5691-5694.**

113. Kumar N and Kumar A. Enzyme-Catalyzed Regioselective Synthesis of 4-Hetero-Functionalized 1,5-Disubstituted 1,2,3-Triazoles. **Organic Letters 26(36), 7514-7519.**

114. Kumar P, Kumar A, Kant R, Shukla SK and Rastogi N. Synthesis of 3-Substituted Chromones through Photoactivation of Acceptor-Acceptor Diazo Compounds. **SYNTHESIS-STUTTGART 56(24), 3785-3792.**

115. Kumar R, Bhadoria D, Kant R and Kumar A. Regio- and Stereoselective Intermolecular 1,2-Difunctionalization of Terminal Alkynes: An Approach to Access (Z)-β-Amidovinylsulfones. **Journal of Organic Chemistry 89(5), 2873-2884.**

116. Kumar R, Sharma P, Chauhan A, Singh N, Prajapati VM and Singh SK. Malate:Quinone Oxidoreductase Knockout Makes *Mycobacterium tuberculosis* Susceptible to Stress and Affects its *In Vivo* Survival. **Microbes and Infection 26(1-2), 105215.**

117. Kumar S and Dikshit M. Nitric Oxide: Regulation and Function in Neutrophil Immune Responses. **Antioxidants & Redox Signaling 40(16-18), 998-1024.**

118. Kumar S, Gupta AK, Vaishanv NK, Kant R and Mohanan K. CsF-Mediated Reaction of Diazo Compounds with 3-Nitroindoles: Access to Cyano- and Phosphonylpyrazolo[4,3-b] Indoles. **New Journal of Chemistry 48(40), 17670-17675.**

119. Kumar S, Rastogi SK, Roy S, Sharma K, Kumar S, Maity D, Chand D, Vishwakarma S, Gayen JR, Srivastava KR, Kumar R and Yadav PN. Discovery and Structure - Activity Relationships of 2,4,5-Trimethoxyphenyl Pyrimidine Derivatives as Selective D5 Receptor Partial Agonists. **Bioorganic Chemistry 153, 107809.**

120. Kumar S, Singh N, Lahane V, Tripathi V, Yadav AK and Shukla RK. Methyl Jasmonate Inducible UGT79A18 is a Novel

Glycosyl Transferase Involved in the Bacoside Biosynthetic Pathway in *Bacopa monnieri*. **Physiologia Plantarum 176(2), e14260.**

121. Kumar S, Vassallo JD, Nattamai KJ, Hassan A, Vollmer A, Karns R, Sacma M, Nemkov T, D'Alessandro A and Geiger H. Rejuvenation of the Reconstitution Potential and Reversal of Myeloid Bias of Aged HSCs Upon pH Treatment. **Aging Cell 23(10), e14324.**

122. Kumar TA, Birua S, SharathChandra M, Mukherjee P, Singh S, Kaul G, Akhir A, Chopra S, Hirschi J, Singh A and Chakrapani H. An Arm-to-Disarm Strategy to Overcome Phenotypic AMR in *Mycobacterium tuberculosis*. **bioRxiv (Version 2), 533925.**

123. Kumari N, Sharma R, Ali J, Chandra G, Singh S and Krishnan MY. The Use of *Mycobacterium tuberculosis* H37Ra-Infected Immunocompetent Mice as an *In vivo* Model of Persisters. **Tuberculosis 145, 102479.**

124. Kundu S, Gairola S, Verma S, Mugale MN and Sahu BD. Chronic Kidney Disease Activates the HDAC6-Inflammatory Axis in the Heart and Contributes to Myocardial Remodeling in Mice: Inhibition of HDAC6 Alleviates Chronic Kidney Disease-Induced Myocardial Remodeling. **Basic Research in Cardiology 119(5), 831-852.**

125. Kundu S, Ghosh A, Yadav KS, Mugale MN and Sahu BD. Imperatorin Ameliorates Kidney Injury in Diabetic Mice by Regulating the TGF-β/Smad2/3 Signaling Axis, Epithelial-to-Mesenchymal Transition, and Renal Inflammation. **European Journal of Pharmacology 963, 76250.**

126. Kushavah U, Mahapatra PP, Ahmed S and Siddiqi MI. Pharmacophore-Based 3D-QSAR Modeling, Virtual Screening, Docking, Molecular Dynamics and Biological Evaluation Studies for Identification of Potential Inhibitors of alpha-Glucosidase. **Journal of Molecular Modeling 30(11), 389.**

127. Kushawaha AK, Jaiswal AK, Gupta J, Katiyar S, Ansari A, Bhatt H, Sharma SK, Choudhury AD, Bhatta RS, Singh BN and Sashidhara KV. Antitubercular Evaluation of Dihydropyridine-triazole Conjugates: Design, Synthesis, *In vitro* Screening, SAR and *In silico* ADME Predictions. **RSC Medicinal Chemistry 15(8), 2867-2881.**

128. Lata M, Telang V, Gupta P, Pant G, Kalyan M, Arockiaraj J and Pasupuleti M. Synthetic Short Cryptic Antimicrobial Peptides as Templates for the Development of Novel Biotherapeutics Against WHO Priority Pathogen. **International Journal of Peptide Research and Therapeutics 30(5), 57.**

129. Laxminarayan R, Impalli I, Rangarajan R, Cohn J, Ramjeet K, Trainor BW, Strathdee S, Sumpradit N, Berman D, Wertheim H, Outterson K, Srikantiah P and Theuretzbacher U. Expanding Antibiotic, Vaccine, and Diagnostics Development and Access to Tackle Antimicrobial Resistance. **The Lancet 403(10443), 2534-2550.**

130. Mahapatra PP and Ahmed S. Fission Yeast Bsd1 is Required for ER Stress Response in Ire1 Independent Manner. **Molecular Biology Reports 52(1), 19.**

131. Majhi S, Awasthi BP, Sharma RK and Mitra K. Buparvaquone Induces Ultrastructural and Physiological Alterations Leading to Mitochondrial Dysfunction and Caspase-Independent Apoptotic Cell Death in *Leishmania donovani*. **Microscopy and Microanalysis 30(3), 521-538.**

132. Maji S, Akhtar S, Halder S, Chatterjee I, Verma DP, Verma NK, Saroj J, Saxena D, Maitra R, Sharma J, Sharma B, Sakurai H, Mitra K, Chopra S, Ghosh JK and Panda G. Corannulene Amino Acid-Derived Water-Soluble Amphiphilic Buckybowls as Broad-Spectrum Membrane Targeting Antibacterial Agents. **Journal of Medicinal Chemistry 67(17), 15041-15060.**

133. Maji S, Halder S, Sharma AK, Madhesiya A, Thakur TS and Panda G. Stereoselective Construction of 3-(Aminoalkylidene)oxindoles in One Pot: Development of a Novel, Robust, and Scalable Process for the Multigram-Scale Preparation of Nintedanib. **Organic Process Research & Development 28(3), 754-769.**

134. Marwaha D, Singh N, Gautam S, Rai N, Tiwari P, Bakshi AK, Kumar A, Agarwal N, Sharma M, Shukla RP and Mishra PR. Pemetrexed-Loaded Supramolecular Acetal-Functionalized pH-Responsive Nanocarriers Selectively Induce Apoptosis through Biotin Receptors to Enhance Antitumor Efficacy. **Colloids and Surfaces B: Biointerfaces 245, 114247.**

135. Maurya S, Gaur M, Akhtar MS and Yadav AB. Evaluation of Drug-Loaded and Surface-Adsorbed DNase/Tween-80 Solid Lipid Nanoparticles against *Staphylococcus aureus* Biofilms. **ACS Applied Bio Materials 2024(7), 1501-1512.**

136. Mehta P, Sethi S, Yadav SK, Gupta G and Singh R. Heat Stress Induced piRNA Alterations in Pachytene Spermatocytes and Round Spermatids. **Reproductive Biology and Endocrinology 22(1), 87.**

137. Mehta P, Sharma A, Goswami A, Gupta SK, Singhal V, Srivastava KR, Chattopadhyay N and Singh R. Case Report: Exome Sequencing Identified Mutations in the LRP5 and LGR4 Genes in a Case of Osteoporosis with Recurrent Fractures and Extraskeletal Manifestations. **Frontiers in Endocrinology 15, 1475446.**

138. Mehta P, Vishvkarma R, Gupta S, Chattopadhyay N and Rajender S. Exome Sequencing Identified Mutations in the WNT1 and COL1A2 Genes in Osteogenesis Imperfecta Cases. **Molecular Biology Reports 51(1), 449.**

139. Mir KB, Chakraborty S, Amin T, Kumar A, War AR, Nalli Y, Kumar R, Kumar LD, Ali A and Goswami A. Canonical DDR

Activation by EMT Inducing Agent 5-Fluorouracil is Modulated by a Cannabinoid Based Combinatorial Approach *via* Inducing Autophagy and Suppression of Vimentin Expression. **Biochemical Pharmacology 223, 116126.**

140. Mishra A, Biswas A, Choudhury AD, Verma S, Prasad YD, Singh V, Bisen AC, Kumar M and Bhatta RS. Simultaneous Determination Of Amphotericin B, Tobramycin and Vancomycin in Rabbit Ocular Biofluids and Tissues by LC-MS/MS: An Antimicrobial Therapy for Keratitis and its PK-PD Application. **Journal of Chromatography B: Analytical Technologies in the Biomedical and Life Sciences 1233, 123960.**

141. Mishra A, Choudhury AD, Biswas A, Singh V, Verma S, Bisen AC, Kumar M and Bhatta RS. Concurrent Determination of Anti-microbial and Anti-inflammatory Drugs in Lachrymal Fluid and Tissue by LC-MS/MS: A Potential Treatment for Microbial Keratitis and its PK-PD Evaluation. **Journal of Pharmaceutical and Biomedical Analysis 239, 115920.**

142. Mishra A, Paul P, Srivastava M and Mishra S. A *Plasmodium* Late Liver Stage Arresting GAP Provides Superior Protection in Mice. **npj Vaccines 9(1), 193.**

143. Mishra A, Rajput S, Srivastava PN, Shabeer Ali H and Mishra S. Autophagy Protein Atg7 is Essential for Maintaining Malaria Parasite Cellular Homeostasis and Organelle Biogenesis. **mBio 16(2), e0273524.**

144. Mishra N, Sharma M, Mishra P, Nisha R, Singh P, Pal RR, Singh N, Singh S, Maurya P, Pant S, Mishra PR and Saraf SA. Transporter Targeted-Carnitine Modified Pectin-Chitosan Nanoparticles for Inositol Hexaphosphate Delivery to the Colon: An *In silico* and *In vitro* Approach. **International Journal of Biological Macromolecules 263(Part 2), 130517.**

145. Mishra S, Kapoor R, Sushma, Kanchan S, Jha G, Sharma D, Tomar B and Rath SK. Deoxynivalenol Induces Drp-1-Mediated Mitochondrial Dysfunction *via* Elevating Oxidative Stress. **Chemical Research in Toxicology.**

146. Mishra V, Baranwal V, Mugale MN, Sharma S and Mishra RK. Stat3 Induces IL-10 and SR-A/CD204 Expression in Silica Nanoparticle-Triggered Pulmonary Fibrosis through Transactivation. **ACS Biomaterials Science & Engineering 11(1), 609-622.**

147. Mohanan A, Washimkar KR and Mugale MN. Unraveling the Interplay between Vital Organelle Stress and Oxidative Stress in Idiopathic Pulmonary Fibrosis. **Biochimica et Biophysica Acta (BBA) - Molecular Cell Research 1871(3), 119676.**

148. Moin MR, Das S and Sanyal S. Emerging Roles of Osteocytes in Regulation of Bone and Skeletal Muscle Mass. **Journal of Molecular Endocrinology 74(1), e240033.**

149. Mondal I, Gupta N, Sharma V, Sarkar C, Mishra DP and Kulshreshtha R. ALDH5A1/miR-210 Axis Plays a Key Role in Reprogramming Cellular Metabolism and has a Significant Correlation with Glioblastoma Patient Survival. **Cancer Cell International 24(1), 259.**

150. Murugan R, Nayak SPRR, Haridevamuthu B, Priya D, Rajagopal R, Pasupuleti M, Guru A, Kumaradoss KM and Arockiaraj J. Multifaceted Evaluation of Pyrazole Derivative (T4)-Chitosan (CS) Nanoparticles: Morphology, Drug Release, and Anti-tumor Efficacy in a Rat Model. **International Journal of Biological Macromolecules 283(Part 3), 137702.**

151. Nainawat KS, Gupta K, Gupta N, Singh R, Mishra D, Nirwan A, Verma M, Singh A, Vasudev PG, Khan F, Mishra DP and Gupta A. Synthesis of 2,2-Dimethyl-Chroman-Based Stereochemically Flexible and Constrained Anti-Breast Cancer Agents. **Bioorganic & Medicinal Chemistry Letters 108, 129789.**

152. Nalli Y, Bashir Mir K, Amin T, Gannedi V, Jameel E, Goswami A and Ali A. Divergent Synthesis of Fractionated *Cannabis sativa* Extract Led to Multiple Cannabinoids C-&O-Glycosides with Anti-proliferative/Anti-metastatic Properties. **Bioorganic Chemistry 143, 107030.**

153. Narwal SK, Mishra A, Devi R, Ghosh A, Choudhary HH and Mishra S. Stearoyl-CoA Desaturase Regulates Organelle Biogenesis and Hepatic Merozoite Formation in *Plasmodium berghei*. **Molecular Microbiology 121(5), 940-953.**

154. Nayak B, Paul P and Mishra S. Neddylation is Essential for Malaria Transmission in *Plasmodium berghei.* **mBio 15(4).**

155. Nirdosh, Shukla H and Mishra S. An ApiAp2 Transcription Factor with a Dispensable Role in *Plasmodium berghei* Life Cycle. **ACS Infectious Diseases 10(6), 1904-1913.**

156. Padhan P, Simran, Kumar N and Verma S. Glutathione S-Transferase: A Keystone in Parkinson's Disease Pathogenesis and Therapy. **Molecular and Cellular Neuroscience 132, 103981.**

157. Pal S, Sharma S, Porwal K, Tiwari MC, Khan YA, Kumar S, Kumar N and Chattopadhyay N. The Role of Osteogenic Effect and Vascular Function in Bone Health in Hypertensive Rats: A Study of Anti-hypertensive and Hemorheologic Drugs. **Calcified Tissue International 114(3), 295-309.**

158. Paliwal K, Swain A, Mishra DP, Antharjanam PKS and Kumar M. A Novel Copper(II) Complex with a Salicylidene Carbohydrazide Ligand that Promotes Oxidative Stress and Apoptosis in Triple Negative Breast Cancer Cells. **Dalton Transactions 53(43), 17702-17720.**

159. Pallavi S, Jain S, Mohanty SK, Andrabi SW and Rajender S. Retinoic Acid Regulates Spermiogenesis *via* Hoxb1 and Shh Signaling in Testicular Germ Cells. **Reproductive Sciences 31(11), 3400-3412.**

160. Panda MS, Qazi B, Vishwakarma V, Pattnaik GP, Haldar S and Chakraborty H. Developing Peptide-Based Fusion Inhibitors as an Antiviral Strategy Utilizing Coronin 1 as a Template. **RSC Medicinal Chemistry 16(1), 125-136**

161. Pandey R, Kaul G, Akhir A, Saxena D, Shukla M, Mundra S, Zohib M, Singh S, Pal RK, Tripathi S, Jain A, Chopra S and Arora A. Characterization of Structure of Peptidyl-tRNA Hydrolase from *Enterococcus faecium* and its Inhibition by a Pyrrolinone Compound. **International Journal of Biological Macromolecules 275(1), 133445.**

162. Pandit S and Majumdar N. Catalytic Intermolecular [4+2]-Cycloaddition toward the Stereoselective C2-C3 Annulation of Indoles. **SYNTHESIS-STUTTGART 57(2), 362-379.**

163. Panjla A, Kaul G, Shukla M, Akhir A, Tripathi S, Arora A, Chopra S and Verma S. Membrane-targeting, Ultrashort Lipopeptide Acts as an Antibiotic Adjuvant and Sensitizes MDR Gram-negative Pathogens toward Narrow-spectrum Antibiotics. **Biomedicine & Pharmacotherapy 176, 116810.**

164. Parul, Singh A and Shukla S. Novel Techniques for Early Diagnosis and Monitoring of Alzheimer's Disease. **Expert Review of Neurotherapeutics 25(1), 29-42.**

165. Parveen S, Chaurasia N, Gupta S, Vidyarthi S, Gupta N, Pandey P, Pant B, Srivastava KR, Kumar N and Goel A. Rationally Designed G-Quadruplex Selective "Turn-On" NIR Fluorescent Probe with Large Stokes Shift for Nucleic Acid Research-Based Applications. **ACS Applied Bio Materials 7(11), 7233-7243.**

166. Parwez S, Chaurasia A, Mahapatra PP, Ahmed S and Siddiqi MI. Integrated Machine Learning-Based Virtual Screening and Biological Evaluation for Identification of Potential Inhibitors Against Cathepsin K. **Molecular Diversity.**

167. Patel M, Jaiswal A, Naseer A, Tripathi A, Joshi A, Minocha T, Kautu A, Gupta S, Joshi KB, Pandey MK, Kumar R, Dubey KD, Nazir A, Verma S and Gour N. Amyloidogenic Propensity of Metabolites in the Uric Acid Pathway and Urea Cycle Critically Impacts the Etiology of Metabolic Disorders. **ACS Chemical Neuroscience 15(5), 916-931.**

168. Patel RK, Jha P, Chauhan A, Kant R and Kumar R. Polycyclic Pyrazoles from Alkynyl Cyclohexadienones and Nonstabilized Diazoalkanes *via* [3 + 2]-Cycloaddition/[1,5]-Sigmatropic Rearrangement/Aza-Michael Reaction Cascade. **Organic Letters 26(4), 839-844.**

169. Patel SS, Gupta S and Tripathi CB. Organocatalyzed Hydroacylation of Enones by Photosensitization of Acyl Silanes. **Chemistry: An Asian Journal 19(7), e202400240.**

170. Pathak JK, Kant R and Rastogi N. Chemodivergent Phosphonylation of Diazocarboxylates: Light-on *vs*. Light-off Reactions. **Organic and Biomolecular Chemistry 22(25), 5224-5228.**

171. Paul P, Nayak B and Mishra S. The Role of Neddylation in Malaria Parasites. **DNA and Cell Biology 43(9), 426-429.**

172. Pratap K, Rawat M, Yadav RP and Kumar A. Azole-Substituted Triazole Formation through Organocatalytic Cycloaddition of β-keto Azoles and Aryl Azides. **ChemistrySelect 9(35), e202402928.**

173. Priya PS, Murugan R, Srileka R, Ramya Ranjan Nayak SP, Margesan T, Rajagopal R, Pasupuleti M, Kumarodoss KM and Arockiaraj J. Synergistic defense: Quercetin and Chondroitin Sulfate Combat Bacterial Trigger of Rheumatoid Arthritis, *Proteus mirabilis* through *In-vitro* and *In-vivo* Mechanisms. **Microbial Pathogenesis 197, 107086.**

174. Qumruddeen, Kumar D, Jose J and Tripathi CB. Lewis Base Catalyzed C-S Bond Formation through Methyl C(sp^3)-H Thiocyanation of Indoles. **Asian Journal of Organic Chemistry 13(3), e202300495.**

175. Rahangdale R, Ghormode P, Tender T, Balireddy S, Birangal S, Kishore R, Mohammad FS, Pasupuleti M and Chandrashekar HR. Anti-HSV Activity of Nectin-1-Derived Peptides Targeting HSV gD: An *In-silico* and *In-vitro* Approach. **Journal of Biomolecular Structure and Dynamics.**

176. Rai D, Sardar A, Raj A, Maji B, Verma S, Tripathi AK, Gupta S, Sharma A, Dhar YV and Trivedi R. miR4352b a Cross-Species Modulator of SOSTDC1, Targets Dual Pathway to Regulate Bone Health and Fracture Healing. **Biochimica et Biophysica Acta (BBA) - Molecular Basis of Disease 1087(1), 167514.**

177. Rai S, Singh MP, Sinha A, Srivastava A, Datta D and Srivastava S. Unravelling a Novel CTNND1-RAB6A Fusion Transcript: Implications in Colon Cancer Cell Migration. **International Journal of Biological Macromolecules 262(2), 129981.**

178. Raj D, Nair AV, Singh A, Basu S, Sarkar K, Sharma J, Sharma S, Sharma S, Rathore M, Singh S, Prakash S, Simran, Sahu S, Kaushik AC, Siddiqi MI, Ghoshal UC, Chandra T, Bhosale V, Dasgupta A, Gupta SK, Verma S, Guha R, Chakravortty D, Ammanathan V and Lahiri A. *Salmonella typhimurium* Effector SseI Regulates Host Peroxisomal Dynamics to Acquire Lysosomal Cholesterol. **EMBO Reports 26(3), 656-689.**

179. Rajput S, Kulkarni C, Sharma S, Tomar MS, Khatoon S, Gupta A, Sanyal S, Shrivastava A, Ghosh JK and Chattopadhyay N. Osteogenic Effect of an Adiponectin-Derived Short Peptide That Rebalances Bone Remodeling: A Potential Disease-Modifying Approach for Postmenopausal Osteoporosis Therapy. **Archives of Pharmacal Research 47(8-9), 736-755.**

180. Raman SK, Reddy DVS, Jain V, Bajpai U, Misra A and Singh AK. Mycobacteriophages: Therapeutic Approach for Mycobacterial Infections. **Drug Discovery Today 29(7), 104049.**

181. Rana P, Maitra R, Saxena D, Akhir A, Vadakattu M, Kalam A, Joshi SV, Parupalli R, Bhandari V, Madhavi YV, Dasgupta A, Chopra S and Nanduri S. Development of Naphthalimide Hydrazide Derivatives as Potent Antibacterial Agents Against Carbapenem-Resistant *A. baumannii*. **RSC Medicinal Chemistry 15(12), 4011-4017.**

182. Rana P, Parupalli R, Akhir A, Saxena D, Maitra R, Imran M, Malik P, Ghouse SM, Joshi SV, Srikanth D, Madhavi YV, Dasgupta A, Chopra S and Nanduri S. Synthesis and Biological Evaluation of New Naphthalimide-Thiourea Derivatives as Potent Antimicrobial Agents Active Against Multidrug-Resistant *Staphylococcus aureus* and *Mycobacterium tuberculosis*. **RSC Medicinal Chemistry 15(4), 1381-1391.**

183. Rana P, Supriya MS, Kalam A, Eedulakanti C, Kaul G, Akhir A, Sindhuja RH, Roy A, Agnivesh PK, Saxena D, Ahmad MN, Madhavi YV, Dasgupta A, Kalia NP, Nagesh N, Chopra S and Nanduri S. Synthesis and Antibacterial Evaluation of New Naphthalimide-Coumarin Hybrids Against Multidrug-Resistant *S. aureus* and *M. tuberculosis*. **Journal of Molecular Structure 1307, 137957.**

184. Rana R, Kuche K, Jain S and Chourasia MK. Addressing Overlooked Design Considerations for Nanoemulsions. **Nanomedicine 19(3), 2727-2745.**

185. Rana R, Mishra K, Tripathi S, Gupta AK, Tiwari AK, Yadav PK, Kumar A, Chakradhar JVUS, Singh S, Verma S, Yadav P and Chourasia MK. Simultaneous Estimation of Rutin and Donepezil through RP-HPLC: Implication in Pharmaceutical and Biological Samples. **Bioanalysis 16(11), 557-567.**

186. Rastogi A, Kumar M, Gangwar MK and Koley D. Manganese Catalyzed Site-Selective Hydroxymethylation to 2-Pyridones and Isoquinolones *via* C-H Activation. **Advanced Synthesis & Catalysis 366(18), 3815-3821.**

187. Rastogi SK, Khanka S, Kumar S, Lakra A, Rathur R, Sharma K, Bisen AC, Bhatta RS, Kumar R, Singh D and Sinha AK. Design, Synthesis and Biological Evaluation of Novel Pyrimidine Derivatives as Bone Anabolic Agents Promoting Osteogenesis *via* the BMP2/SMAD1 Signaling Pathway. **RSC Medicinal Chemistry 15(2), 677-694.**

188. Ravi V, Shamim U, Khan MA, Swaminathan A, Mishra P, Singh R, Bharali P, Chauhan NS and Pandey R. Unraveling the Genetic Evolution of SARS-CoV-2 Recombinants Using Mutational Dynamics Across the Different Lineages. **Frontiers in Medicine 10, 1294699.**

189. Rawat P, Shyaula SL, Singh Y and Kanojiya S. Structure Analysis of Depsides, Dibenzofuran and Sugar Derivatives from *Cladia aggregata* (SW) Nyl Using Ultra-Performance Liquid Chromatography-Tandem Mass Spectrometry. **European Journal of Mass Spectrometry 30(2), 116-124.**

190. Raza S, Siddiqui JA, Srivastava A, Chattopadhyay N, Sinha RA and Chakravarti B. Autophagy as a Therapeutic Target in Breast Tumors: The Cancer Stem Cell Perspective. **Autophagy Reports 3(1), 27694127.**

191. Raziullah, Kumar M, Rastogi A, Ahmad A and Koley D. Ru(II)-Catalyzed Weak Chelation-Assisted Regioselective C4-H Aminomethyl Alkenylation of Indole. **Advanced Synthesis & Catalysis 367(1), e202400863.**

192. Reddy DVS, Sofi HS, Roy T, Verma S, Washimkar KR, Raman SK, Singh S, Azmi L, Ray L, Singh J, Mugale MN, Singh AK and Misra A. Macrophage-Targeted *vs* Free Calcitriol as Host-Directed Adjunct Therapy Against *Mycobacterium tuberculosis* Infection in Mice is Bacteriostatic and Mitigates Tissue Pathology. **Tuberculosis 148, 102536.**

193. Roy HS, Murugesan P, Kulkarni C, Arora M, Nagar GK, Guha R, Chattopadhyay N and Ghosh D. On-demand Release of a Selective MMP-13 Blocker from an Enzyme-Responsive Injectable Hydrogel Protects Cartilage from Degenerative Progression in Osteoarthritis. **Journal of Materials Chemistry B 12(22), 5263-5562.**

194. Saha S, Khanppnavar B, Maharana J, Kim H, Carino CMC, Daly C, Houston S, Sharma S, Zaidi N, Dalal A, Mishra S, Ganguly M, Tiwari D, Kumari P, Jhingan GD, Yadav PN, Plouffe B, Inoue A, Chung KY, Banerjee R, Korkhov VM and Shukla AK. Molecular Mechanism of Distinct Chemokine Engagement and Functional Divergence of the Human Duffy Antigen Receptor. **Cell 187(17), 4751-4769.**

195. Saklani R, Yadav PK, Tiwari AK, Gawali SL, Hassan PA, Yadav K, Mugale MN, Kalleti N, Rath SK, Mishra DP, Dierking I and Chourasia MK. Synchronized Codelivery of Combination Chemotherapies Intratumorally Using a Lipidic Lyotropic Liquid Crystal System. **ACS Applied Materials & Interfaces 16(22), 29098-29111.**

196. Samreen, Ahmad I, Khan SA, Naseer A and Nazir A. Green Synthesized Silver Nanoparticles from *Phoenix Dactylifera* Synergistically Interact with Bioactive Extract of *Punica granatum* Against Bacterial Virulence and Biofilm Development. **Microbial Pathogenesis 192, 106708.**

197. Sangu KG, Dusthackeer VNA, Singh VK, Maykalwar S, Krishna EV, Angayarkanni B, Maitra R, Chopra S, Misra S and Rode HB. 3,5-Disubstituted Pyridines with Potent Activity Against Drug-Resistant *Mycobacterium tuberculosis* Clinical Isolates. **Future Medicinal Chemistry 16(22), 2351-2369.**

198. Sangwan R, Azeem Z and Mandal PK. Recent Advances and Strategies towards Synthesis of Indolyl and Tryptophan-C-Glycoside Scaffolds. **Advanced Synthesis & Catalysis 366(7), 1484-1508.**

199. Sardar A, Rai D, Tripathi AK, Chutani K, Sinha S, Dhaniya G and Trivedi R. FDA-Approved Polypeptide PTH 1-34 Impedes Palmitic Acid-Mediated Osteoblasts Dysfunction by Promoting its Differentiation and Thereby Improving Skeletal Health. **Molecular and Cellular Endocrinology 597, 112445.**

200. Sethi A, Mishra S, Upadhyay V, Dubey P, Siddiqui S, Singh AK, Chowdhury S, Srivastava S, Srivastava, P, Sahoo P, Bhatt MLB, Mishra A and Trivedi AK. USP10 Deubiquitinates and Stabilizes CD44 Leading to Enhanced Breast Cancer Cell Proliferation Stemness and Metastasis. **Biochemical Journal 481(24), 1877-1900.**

201. Sethi M, Rana R, Sambhakar S and Chourasia MK. Nanocosmeceuticals: Trends and Recent Advancements in Self Care. **AAPS PharmSciTech 25(3), 51.**

202. Sethi S, Mehta P, Andrabi W, Mitra K and Rajender S. SPEM1 Gene Mutation in a Case with Sperm Morphological Defects Leading to Male Infertility. **Reproductive Sciences 31(10), 3102-3111.**

203. Shaham SH, Joshi P, Shabeer Ali H, Yadav K, Sharma A, Mugale MN and Tripathi R. Role of Angiotensin Pathway and its Target Therapy to Rescue from Experimental Cerebral Malaria. **Microbes and Infection 26(4), 105333.**

204. Sharma J, Khan S, Singh NC, Sahu S, Raj D, Prakash S, Bandyopadhyay P, Sarkar K, Bhosale V, Chandra T, Kumaravelu J, Barthwal MK, Gupta SK, Srivastav M, Guha R, Ammanathan V, Ghoshal UC, Mitra K and Lahiri A. ORMDL3 Regulates NLRP3 Inflammasome Activation by Maintaining ER-Mitochondria Contacts in Human Macrophages and Dictates Ulcerative Colitis Patient Outcome. **Journal of Biological Chemistry 300(4), 107120.**

205. Sharma S, Kumar S, Tomar MS, Chauhan D, Kulkarni C, Rajput S, Sadhukhan S, Porwal K, Guha R, Shrivastava A, Gayen JR, Kumar N and Chattopadhyay N. Multiscale Effects of the Calcimimetic Drug, Etelcalcetide on Bone Health of Rats with Secondary Hyperparathyroidism Induced by Chronic Kidney Disease. **Bone 185, 117126.**

206. Sharma S, Shankar V, Rajender S, Mithal A, Rao SD and Chattopadhyay N. Impact of Anti-Fracture Medications on Bone Material and Strength Properties: A Systematic Review and Meta-Analysis. **Frontiers in Endocrinology 15, 1426490.**

207. Shekhar S, Meena R, Lal J, Yadav M, Kant R and Reddy DN. Stabilizing Bifurcated Hydrogen Bond in 8-Aminoquinoline Appended Peptides. **Chemistry-An Asian Journal 19(4), e202400248.**

208. Shinde PS, Shinde VS and Rueping M. Electrochemical Low Valent Cobalt-Catalyzed Addition of Aryl and Vinyl Chlorides to α-Ketoamides *via* C-Cl Bond Activation. **Chemical Communications 60(28), 3826-3829.**

209. Shree M, Vaishnav J, Gurudayal and Ampapathi RS. *In-silico* Assessment of Novel Peptidomimetics Inhibitor Targeting STAT3 and STAT4 N-Terminal Domain Dimerization: A Comprehensive Study Using Molecular Docking, Molecular Dynamics Simulation, and Binding free Energy Analysis. **Biochemical and Biophysical Research Communications 733, 150584.**

210. Shrivastava D, Abboud E, Ramchandra JP, Jha A, Marq JB, Chaurasia A, Mitra K, Sadik M, Siddiqi MI, Soldati-Favre D, Kloehn J and Habib S. ATM1, An Essential Conserved Transporter in *Apicomplexa*, Bridges Mitochondrial and Cytosolic [Fe-S] Biogenesis. **PLOS Pathogens 20(9), e1012593.**

211. Shrivastava D, Jha A, Kabrambam R, Vishwakarma J, Mitra K, Ramachandran R and Habib S. *Plasmodium falciparum* ZIP1 Is a Zinc-Selective Transporter with Stage-Dependent Targeting to the Apicoplast and Plasma Membrane in Erythrocytic Parasites. **ACS Infectious Diseases 10(1), 155-169.**

212. Shukla RP, Tiwari P, Sardar A, Urandur S, Gautam S, Marwaha D, Tripathi AK, Rai N, Trivedi R and Mishra PR. Alendronate-Functionalized Porous Nano-Crystalsomes Mitigate Osteolysis and Consequent Inhibition of Tumor Growth in a Tibia-Induced Metastasis Model. **Journal of Controlled Release 372, 331-346.**

213. Shukla V, Ahmad M, Nayak GC, Thakur TS and Siddiqui KA. High Cell Volume Zn-Metal-organic Framework: Unveiling the Pseudo-Capacitor Properties and Selective Colorimetric Recognition of Oxyanions. **Crystal Growth & Design 24(9), 3977-3992.**

214. Singh A, Ansari A, Gupta J, Singh H, Jagavelu K and Sashidhara KV. Androsin Alleviates Non-Alcoholic Fatty Liver Disease by Activating Autophagy and Attenuating *de novo* Lipogenesis. **Phytomedicine 129, 155702.**

215. Singh A, Tiwari S and Singh S. Pirh2 Modulates the Mitochondrial Function and Cytochrome c-Mediated Neuronal Death During Alzheimer's Disease. **Cell Death & Disease 15(5), 331.**

216. Singh A, Tripathi R, Gupta RK, Rashid R and Jha RK. Gonadotropin Upregulates Intraovarian Calpains-1 and -2 During Ovarian Follicular Recruitment in the SD Rat Model. **Reproductive Biology 24(2), 100862.**

217. Singh AK, Rai A, Joshi I, Reddy DN, Guha R, Alka K, Shukla S, Rath SK, Nazir A, Clement JP and Kundu TK. Oral Administration of a Specific p300/CBP Lysine Acetyltransferase Activator Induces Synaptic Plasticity and Repairs Spinal Cord Injury. **ACS Chemical Neuroscience 15(15), 2741-2755.**

218. Singh AK, Thacker G, Upadhyay V, Mishra M, Sharma A, Sethi A, Chowdhury S, Siddiqui S, Verma SP, Pandey A, Bhatt MLB

and Trivedi AK. Nemo-like Kinase Blocks Myeloid Differentiation by Targeting Tumor Suppressor C/EBPα in AML. **The FEBS Journal 291(20), 4539-4557.**

219. Singh AK, Upadhyay V, Sethi A, Chowdhury S, Mishra S, Verma SP, Bhatt MLB and Trivedi AK. Ring Finger Protein 138 Inhibits Transcription Factor C/Ebpα Protein Turnover Leading to Differentiation Arrest in Acute Myeloid Leukemia. **Biochemical Journal 481(10), 653-666.**

220. Singh D, Kumar S, Mishra R, Anjali, Tripathi RK and Sachdev M. HIV1-Nef Perturbs the Integrity of Blood Testis Barrier in Rat Model. **Tissue Barriers, 2357406.**

221. Singh H, Satish N, Babu TR, Singh A, Yadav B, Singh SK, Wahajuddin M, Siddiqui MI, Jagavelu K and Sudhakar G. Functionalized Azirine Based Scaffolds as Endothelin Inhibitors for the Selective Anti-Angiogenic Activity. **European Journal of Medicinal Chemistry 274, 116510.**

222. Singh K, Yadav A, Khan S, Shukla A, Alam M, Verma AK, Tiwari N, Khan F, Yadav PN and Dev K. Baicalein Isolated From *Oroxylum Indicum* Acts As A Potent M- and K-Opioid Receptor Antagonist Agent *via* The Reversal of Agonist-Mediated Camp Inhibition. **Natural Product Research.**

223. Singh P, Pandey A, Bilung CJ, Jeet A, Nimoriya R, Nandan S, Kanojia S, Mishra DK and Tripathi V. Identification of Methyl Jasmonate-Induced Cardiac Glycosides and Related Biosynthetic Transcripts from Callus Culture of *Calotropis gigantea* Using Transcriptome and Metabolite Profiling. ***In Vitro* Cellular & Developmental Biology - Plant 60(4), 575-587.**

224. Singh S, Kant R and Tripathi CB. Photocatalytic Electrocyclization for the Synthesis of Dihydrophenanthrenes. **Asian Journal of Organic Chemistry 13(3), e202300632.**

225. Singh S, Soni M, Gupta N, Sandhu P, Tripathi D, Pratap JV, Subramanian S and Manickam N. Unravelling Biochemical and Molecular Mechanism of A Carboxylesterase from *Dietzia kunjamensis* IITR165 Reveal Novel Activities Against Polyethylene Terephthalate. **Biochemical and Biophysical Research Communications 382(4), 32.**

226. Sinha A, Saini KK, Chandramouli A, Tripathi K, Khan MA, Satrusal SR, Verma A, Mandal B, Rai P, Meena S, Nengroo MA, Singh MP, Bhushan NS, Vasudevan M, Singhai A, Singh K, Mishra AK, Kamat SS, Datta D. ACSL4-Mediated H3K9 and H3K27 Hyperacetylation Upregulates SNAIL to Drive TNBC Metastasis. **Proceedings of the National Academy of Sciences of the United States of America 121(52), e2408049121.**

227. Sinha S, Dhankani P, Nahiyera M, Singh KB, Singh D, Mugale MN, Sharma S, Kumaravelu J, Dikshit M and Kumar S. iNOS Regulates Hematopoietic Stem and Progenitor Cells *via* Mitochondrial Signaling and is Critical for Bone Marrow Regeneration. **Free Radical Biology and Medicine 219, 184-194.**

228. Snega Priya P, Surisetti R, Gopi S, Pachaiappan R, Pasupuleti M, Rajagopal R, Alfarhan A, Guru A and Arockiaraj J. Chitosan-Chondroitin Sulfate-Daidzein Nanoconjugate Ameliorates Glucocorticoid Induced Osteoporosis *in vivo*. **International Journal of Biological Macromolecules 280(1), 135662.**

229. Soni UK, Tripathi R and Jha RK. MCP-1 Exerts the Inflammatory Response *via* ILK Activation During Endometriosis Pathogenesis. **Life Sciences 353, 122902.**

230. Srivastava PN, Paul P and Mishra S. Protein O-Fucosyltransferase is Required for the Efficient Invasion of Hepatocytes by *Plasmodium berghei* Sporozoites. **ACS Infectious Diseases 10(4), 1116-1125.**

231. Sultana N, Chauhan D, Yadav PK, Chourasia MK and Gayen JR. Enhanced Oral Bioavailability of Isoformononetin through Nanoemulsion: Development, Optimization, and Characterization. **Journal of Pharmaceutical Innovation 19(2), 8.**

232. Swain N, Sharma S, Maitra R, Saxena D, Kautu A, Singh R, Kesharwani K, Chopra S and Joshi KB. Antimicrobial Peptide Mimetic Minimalistic Approach Leads to Very Short Peptide Amphiphiles-gold Nanostructures for Potent Antibacterial Activity. **ChemMedChem 19(8), e202300576.**

233. Tandon A, Harioudh MK, Verma NK, Saroj J, Gupta A, Pant G, Tripathi JK, Kumar A, Kumari T, Tripathi AK, Mitra K and Ghosh JK. Characterization of a Myeloid Differentiation Factor 2-Derived Peptide that Facilitates THP-1 Macrophage-Mediated Phagocytosis of Gram-Negative Bacteria. **ACS Infectious Diseases 10(3), 845-857.**

234. Terhüja M, Siddappa M, Lamichhane P, Meshram CD, Snider TA, Ritchey JW and Oomens AGP. Intranasal Vaccination with a Respiratory-Syncytial-Virus-Based Virus-like Particle Displaying the G Protein Conserved Region Induces Severe Weight Loss and Pathology upon Challenge with Wildtype Respiratory Syncytial Virus. **Viruses-Basel 16(6), 843.**

235. Thapa S, Nalli Y, Singh A, Singh SK and Ali A. Neuroprotective Effects of Cannabispirenone A against NMDA-Induced Excitotoxicity in Differentiated N2a Cells. **Oxidative Medicine and Cellular Longevity 2024, 530499.**

236. Tiwari A, Khanam A, Lal M and Mandal PK. Stereoselective Organocatalyzed Glycosylation of Glycosyl Trichloroacetimidate Donors: Thiouracil as Bronsted Acid Catalyst. **Advanced Synthesis & Catalysis 366(15), 3262-3268.**

237. Tiwari A, Verma N, Shukla H, Mishra S, Kennedy K, Chatterjee T, Kuldeep J, Parwez S, Siddiqi MI, Ralph SA, Mishra S and Habib S. DNA N-glycosylases Ogg1 and EndoIII as

Components of Base Excision Repair in *Plasmodium falciparum* Organelles. **International Journal for Parasitology 54(13), 675-689.**

238. Tiwari P, Elgazzaz M, Lazartigues E and Hanif K. Effect of Diminazene Aceturate, an ACE2 Activator, on Platelet CD40L Signaling Induced Glial Activation in rat Model of Hypertension. **International Immunopharmacology 139, 112654.**

239. Tiwari P, Mueed S, Abdulkareem AO and Hanif K. Activation of Angiotensin Converting Enzyme 2 Promotes Hippocampal Neurogenesis *via* Activation of Wnt/B-Catenin Signaling in Hypertension. **Molecular and Cellular Neuroscience 130, 103953.**

240. Tiwari P, Shukla RP, Yadav K, Panwar D, Agarwal N, Kumar A, Singh N, Bakshi AK, Marwaha D, Gautam S, Rai N and Mishra PR. Exploring Nanocarriers as Innovative Materials for Advanced Drug Delivery Strategies in Onco-Immunotherapies. **Journal of Molecular Graphics and Modelling 128, 108702.**

241. Tiwari P, Shukla RP, Yadav K, Singh N, Marwaha D, Gautam S, Bakshi AK, Rai N, Kumar A, Sharma D and Mishra PR. Dacarbazine-Primed Carbon Quantum Dots Coated with Breast Cancer Cell-derived Exosomes for Improved Breast Cancer Therapy. **Journal of Controlled Release 365, 43-59.**

242. Tiwari P, Verma S, Washimkar KR and Mugale MN. Immune Cells Crosstalk Pathways, and Metabolic Alterations in Idiopathic Pulmonary Fibrosis. **International Immunopharmacology 135, 112269.**

243. Tiwari P, Yadav K, Shukla RP, Bakshi AK, Panwar D, Das S and Mishra PR. Extracellular Vesicles-Powered Immunotherapy: Unleashing the Potential for Safer and More Effective Cancer Treatment. **Archives of Biochemistry and Biophysics 756, 110022.**

244. Tripathi AK, Sardar A, Rai N, Rai D, Girme A, Sinha S, Chutani K, Hingorani L, Mishra PR and Trivedi R. Withaferin A Ameliorated the Bone Marrow Fat Content in Obese Male Mice by Favoring Osteogenesis in Bone Marrow Mesenchymal Stem Cells and Preserving the Bone Mineral Density. **ACS Pharmacology & Translational Science 7(9), 2621-2636.**

245. Tufail E, Sanyal S, Mithal A, Sanyal S and Chattopadhyay N. The Role of Glucagon-Like Peptides in Osteosarcopenia. **Journal of Endocrinology 264(2), e240210.**

246. Upadhyay V, Sharma S, Sethi A, Singh AK, Chowdhury S, Srivastava S, Mishra S, Singh S, Chattopadhyay N and Trivedi AK. Hakai: A Novel Runx2 Interacting Protein, Augments Osteoblast Differentiation by Rescuing Runx2 from Smurf2-mediated Proteasome Degradation. **Journal of Cellular Physiology 239(9), e31388.**

247. Upadhyay V, Singh AK, Sharma S, Sethi A, Srivastava S, Chowdhury S, Siddiqui S, Chattopadhyay N and Trivedi AK. RING Finger E3 Ligase, RNF138 Inhibits Osteoblast Differentiation by Negatively Regulating Runx2 Protein Turnover. **Journal of Cellular Physiology 239(5), e31217.**

248. Vaishnav J and Ampapathi RS. 1H, 15N and 13C Resonance Backbone and Side-Chain Assignments and Secondary Structure Determination of the BRCT Domain of Mtb LigA. **Biomolecular NMR Assignments 18(1), 105-109.**

249. Varshney S, Kumar D, Choudhary R, Gupta A, Beg M, Shankar K, Rajan S, Srivastava A, Gupta S, Khandelwal N, Balaramnavar VM and Gaikwad AN. Flavopiridol Inhibits Adipogenesis and Improves Metabolic Homeostasis by Ameliorating Adipose Tissue Inflammation in a Diet-Induced Obesity Model. **Biomedicine & Pharmacotherapy 179, 117330.**

250. Vats RP, Pandey P, Gupta S, Gupta S, Pal S and Goel A. Synthesis and Aggregation-Induced Emission Properties of New Carbazole-Based Pyranones and their Ring-Transformed Derivatives. **SYNTHESIS-STUTTGART 57(1), 115-124.**

251. Verma A, Kant R and Ghosh N. *p*-TsOH-Mediated Intramolecular C2-Arylation on NH-Indoles: Access of 5,10-Dihydroindeno[1,2-*b*] Indoles. **Organic Letters 26(32), 6814-6818.**

252. Verma A, Khan MA, Satrusal SR and Datta D. Emerging Role of EZH2 in Solid Tumor Metastasis. **Biochimica et Biophysica Acta (BBA) - Reviews on Cancer 1880(1), 189253.**

253. Verma S, Ishteyaque S, Washimkar KR, Verma S and Mugale MN. Mitochondrial-Mediated Nuclear Remodeling and Macrophage Polarizations: A Key Switch from Liver Fibrosis to HCC Progression. **Experimental Cell Research 434(1), 113878.**

254. Vishwakarma C, Ansari A and Pratap JV. Distinct Oligomerization and NADPH Binding Modes Observed between *L. donovani* and Human Quinone Oxidoreductases. **Biochemical and Biophysical Research Communications 690, 149096.**

255. Werren EA, Peirent ER, Jantti H, Guxholli A, Srivastava KR, Orenstein N, Narayanan V, Wiszniewski W, Dawidziuk M, Gawlinski P, Umair M, Khan A, Khan SN, Geneviève D, Lehalle D, van Gassen KLI, Giltay JC, Oegema R, van Jaarsveld RH, Rafiullah R, Rappold GA, Rabin R, Pappas JG, Wheeler MM, Bamshad MJ, Tsan YC, Johnson MB, Keegan CE, Srivastava A and Bielas SL. Biallelic Variants in CSMD1 are Implicated in a Neurodevelopmental Disorder with Intellectual Disability and Variable Cortical Malformations. **Cell Death & Disease 15(5), 379.**

256. Wirtu SF, Ramaswamy K, Maitra R, Chopra S, Mishra AK and Jule LT. Isolation, Characterization and Antimicrobial Activity Study of *Thymus vulgaris*. **Scientific Reports 14(1), 21573.**

257. Yadav A, Ambule MD and Srivastava AK. Catalyst-free Anti-Markovnikov Hydroamination and Hydrothiolation of Vinyl Heteroarenes in Aqueous Medium: An Improved Process Towards Centhaquine. **Organic and Biomolecular Chemistry 22(8), 1721-1726.**

258. Yadav A, Dogra S, Boda AK, Kumari P, Kumar A, Dash MK and Yadav PN. Kappa Opioid Receptor Activation Induces Epigenetic Silencing of Brain-Derived Neurotropic Factor via HDAC5 in Depression. **ACS Chemical Neuroscience 15(18), 328-3297.**

259. Yadav KS, Bisen AC, Ishteyaque S, Sharma I, Verma S, Sanap SN, Verma S, Washimkar KR, Kumar A, Tripathi V, Bhatta RS and Mugale MN. *Solanum nigrum* Toxicity and Its Neuroprotective Effect Against Retinal Ganglion Cell Death through Modulation of Extracellular Matrix in a Glaucoma Rat Model. **Journal of Ocular Pharmacology and Therapeutics 40(5), 309-324.**

260. Yadav M, Verma S, Tiwari P and Mugale MN. Unraveling the Mechanisms of Hepatogenous Diabetes and its Therapeutic Perspectives. **Life Sciences 353, 122934.**

261. Yadav P, Singh S, Chauhan D, Yadav PK, Tiwari AK, Kothuri N, Verma S, Chakradhar J, Sethi M, Gayen JR and Chourasia MK. LC-MS/MS Method for Simultaneous Doxorubicin and Baicalein Estimation: Formulation and Pharmacokinetic Applications. **Nanomedicine 19(25), 2085-2097.**

262. Yadav P, Singh Y, Chauhan D, Yadav PK, Kedar AS, Tiwari AK, Shah AA, Gayen JR and Chourasia MK. Development and Approval of Novel Injectables: Enhancing Therapeutic Innovations. **Expert Opinion on Drug Delivery 21(4), 639-662.**

263. Yadav PK, Verma S, Chauhan D, Yadav P, Tiwari AK, Saklani R, Gupta D, Rana R, Shah AA, Verma S, Naresh K, Gayen JR and Chourasia MK. Simultaneous Estimation of Paclitaxel and Bortezomib *via* LC-MS/MS: Pharmaceutical and Pharmacokinetic Applications. **Nanomedicine 19(24), 1995-2010.**

264. Yadav R, Mathur I, Haokip HR, Pandey AK, Kumar V and Jain N. Dostarlimab: Review on Success Story and Clinical Trials. **Critical Reviews in Oncology/Hematology 198, 104374.**

265. Yadav S, Kant R and Kuram MR. Dearomative Functionalization of Activated Quinolines: Transfer Hydrogenation/Cycloaddition Cascade to Construct α-Tertiary Amines. **Advanced Synthesis & Catalysis 366(20), 4219-4227.**

266. Yadav V, Zohib M, Singh S, Pal RK, Tripathi S, Jain A, Biswal BK, Dasgupta A and Arora A. Structural and Biophysical Characterization of PadR Family Protein Rv1176c of *Mycobacterium tuberculosis* H37Rv. **International Journal of Biological Macromolecules 263(Pt 2), 130455.**

2 Patents

2.1 Patent Applications Filed in India

Patent Application No. 202411036881 **Date of Filing: 09-May-2024**

Title: 2-PYRIDONE BASED QUINAZOLINE COMPOUNDS AS DUAL EZH2 AND EGFR INHIBITORS

Inventors: Arpita Banerjee, Saumya Ranjan Satrusal, Indranil Chatterjee, Priyanka Rai, Muqtada Ali Khan, Arpon Biswas, Rabi Sankar Bhatta, Jiaur Rahaman Gayen, Aamir Nazir, Gautam Panda, Dipak Datta

Patent Application No. 202441036927 **Date of Filing: 10-May-2024**

Title: TRYPTANTHRIN DERIVATIVES ACTING AGAINST DRUG RESISTANT *MYCOBACTERIUM TUBERCULOSIS*, AND A PROCESS FOR THE PREPARATION THEREOF

Inventors: Sruthi Sudheendran Leena, Ani Deepthi, Sidharth Chopra, Arunava Dasgupta, Pradeep Malik, Mohd Imran

Patent Application No. 202411038350 **Date of Filing: 15-May-2024**

Title: PURINE BASED PHTHALAZINONES AS DUAL PARP AND MTOR INHIBITORS AND USE THEREOF

Inventors: Indranil Chatterjee, Saumya Ranjan Satrusal, Biswajit Mnadal, Arpita Banerjee, Sanjeev Meena, Arpon Biswas, Rabi Sankar Bhatta, Gautam Panda, Dipak Datta

Patent Application No. 202411050266 **Date of Filing: 04-Jul-2024**

Title: PEPTIDE BIO-THERAPEUTICS AS DECOY TO INHIBIT ENTRY OF HERPES SIMPLEX VIRUS

Inventors: Raghu Chandrashekar Hariharapura, Rakesh Ravishankar Rahangdale, Mukesh Pasupuleti, Fayaz Mohammad Abdul Shaik, Sumit Raosaheb Birangal

Patent Application No. 202411062020 **Date of Filing: 14-Aug-2024**

Title: ANTIMICROBIAL PEPTIDE AND ITS COMPOSITION THEREOF

Inventors: Mukesh Pasupuleti, Vrushti Telang, Raj Kishore, Pooja Gupta, Kamini, Jai Kishan, Pushplata Yadav, Shivani Chaudhary, Mohd. Sohail Akhtar, Adity Gupta, Kalyan Mitra, Juhi Sharma, Rabi Sankar Bhatta, Anjali Misra, Awadh Bihari Yadav, Manish Gaur

Patent Application No. 202411077136 **Date of Filing: 10-Oct-2024**

Title: N-FUNCTIONALIZED 3-SULFENYLINDOLE COMPOUND AS ANTIMICROBIAL AGENT AND PROCESS FOR PREPARATION THEREOF

Inventors: Ravindra Kumar, Sidharth Chopra, Arun Kumar Sinha, Abdul Akhir, Deepanshi Saxena, Rahul Maitra, Sumit Kumar Rastogi, Subrata Roy, Santosh Kumar

Patent Application No. IN202513002027 **Date of Filing: 08-Jan-2025**

Title: A COST EFFECTIVE PROCESS FOR PREPARATION OF NINTEDANIB

Inventors: Gautam Panda, Sabyasachi Halder, Sohini Chatterjee, Souvik Barman

2.2 Patents Granted in India

Patent No. 550935 **Date of Grant: 24-Sep-2024**

Title: AZIRINE CONTAINING COMPOUNDS AS ANTI-ANGIOGENESIS AGENTS AND PREPARATION THEREOF

Inventors: Gangarajula Sudhakar, Nagam Satish, Tella Ramesh Babu, Kumaravelu Jagavelu, Himalaya Singh, Mohammad Imran Siddiqi, Muhammad Wahajuddin, Sandeep Kumar Singh, Mamunur Rashid, Anil Kumar Karunakaran Sasikala

Patent No. 552068 **Date of Grant: 08-Oct-2024**

Title: SYNERGISTIC FORMULATION FOR THE PREVENTION OR TREATMENT OF OSTEOARTHRITIS/ JOINT RELATED DISORDERS

Inventors: Ritu Trivedi, Rabi Shankar Bhatta, Priyanka Kothari, Ashish K Tripathi, V Teja Banala, Sudhir Kumar, Divya Rai, Shradha Sinha, Rakesh Maurya, Prabhat Ranjan Mishra, Lal Hingorani

2.3 Patent Applications Filed in Foreign Countries

PCT Patent Application No. PCT/IN2024/050416 **Date of Filing: 19-Apr-2024**

Title: NOVEL SUBSTITUTED AMINOPYRIDINES AS 5-HYDROXYTRYPTAMINE RECEPTOR MODULATORS AND USES THEREOF

Inventors: Atul Goel, Prem Narayan Yadav, Parimal Misra, Shachi Mishra, Jagriti Singh, Sajiya Parveen, Ankita Mishra, Annu Yadav, Wahajuddin, Swati Chaturvedi

Japan Patent Application No. 2024-527773 **Date of Filing: 13-May-2024**

Title: SUBSTITUTED DIAZENYLANILINES AS FLUORESCENCE QUENCHER AND USE THEREOF

Inventors: Atul Goel, Kundan Singh Rawat, Priyanka Pandey, Ashish Arora, Niti Kumar, Damodara Reddy Nandarapu

US Patent Application No. 18/711488 **Date of Filing: 17-May-2024**

Title: SUBSTITUTED DIAZENYLANILINES AS FLUORESCENCE QUENCHER AND USE THEREOF

Inventors: Atul Goel, Kundan Singh Rawat, Priyanka Pandey, Ashish Arora, Niti Kumar, Damodara Reddy Nandarapu

New Zealand Patent Application No. 811103 **Date of Filing: 20-May-2024**

Title: SUBSTITUTED DIAZENYLANILINES AS FLUORESCENCE QUENCHER AND USE THEREOF

Inventors: Atul Goel, Kundan Singh Rawat, Priyanka Pandey, Ashish Arora, Niti Kumar, Damodara Reddy Nandarapu

China Patent Application No. 202280077290.2 **Date of Filing: 21-May-2024**

Title: SUBSTITUTED DIAZENYLANILINES AS FLUORESCENCE QUENCHER AND USE THEREOF

Inventors: Atul Goel, Kundan Singh Rawat, Priyanka Pandey, Ashish Arora, Niti Kumar, Damodara Reddy Nandarapu

Brazil Patent Application No. BR 1120240100863 **Date of Filing: 21-May-2024**

Title: SUBSTITUTED DIAZENYLANILINES AS FLUORESCENCE QUENCHER AND USE THEREOF

Inventors: Atul Goel, Kundan Singh Rawat, Priyanka Pandey, Ashish Arora, Niti Kumar, Damodara Reddy Nandarapu

Canada Patent Application No. 3238881 **Date of Filing: 22-May-2024**

Title: SUBSTITUTED DIAZENYLANILINES AS FLUORESCENCE QUENCHER AND USE THEREOF

Inventors: Atul Goel, Kundan Singh Rawat, Priyanka Pandey, Ashish Arora, Niti Kumar, Damodara Reddy Nandarapu

European Patent Application No: 24180628 **Date of Filing: 06-Jun-2024**

Title: THIOUREA-BASED DERIVATIVES AS NOVEL ANTIMICROBIALS AGAINST *A. BAUMANNI*

Inventors: Alexander Titz, Marta Czekanska, Sidharth Chopra, Sandeep Verma

Korean Patent Application No. 10-2024-7019685 **Date of Filing: 13-Jun-2024**

Title: SUBSTITUTED DIAZENYLANILINES AS FLUORESCENCE QUENCHER AND USE THEREOF

Inventors: Atul Goel, Kundan Singh Rawat, Priyanka Pandey, Ashish Arora, Niti Kumar, Damodara Reddy Nandarapu

European Patent Application No. 22898127 **Date of Filing: 18-Jun-2024**

Title: SUBSTITUTED DIAZENYLANILINES AS FLUORESCENCE QUENCHER AND USE THEREOF

Inventors: Atul Goel, Kundan Singh Rawat, Priyanka Pandey, Ashish Arora, Niti Kumar, Damodara Reddy Nandarapu

Colombian Patent Application No. NC2024/0007738 **Date of Filing: 19-Jun-2024**

Title: SUBSTITUTED DIAZENYLANILINES AS FLUORESCENCE QUENCHER AND USE THEREOF

Inventors: Atul Goel, Kundan Singh Rawat, Priyanka Pandey, Ashish Arora, Niti Kumar, Damodara Reddy Nandarapu

Australian Patent Application No. 2022396841 **Date of Filing: 24-Jun-2024**

Title: SUBSTITUTED DIAZENYLANILINES AS FLUORESCENCE QUENCHER AND USE THEREOF

Inventors: Atul Goel, Kundan Singh Rawat, Priyanka Pandey, Ashish Arora, Niti Kumar, Damodara Reddy Nandarapu

US Patent Application No. 18/876855 **Date of Filing: 19-Dec-2024**

Title: BETA CARBOLINE ANALOGUES AS SELECTIVE AND BIASED KAPPA OPIOID RECEPTORS AGONISTS FOR TREATING VARIOUS ASSOCIATED PATHOPHYSIOLOGICAL CONDITIONS

Inventors: Sanjay Batra, Prem Narayan Yadav, Veena Yadav, Lalan Kumar, Shalini Dogra, Poonam Kumari, Ajeet Kumar, Adilakshmi Vutla

European Patent Application No. 23826694.4 **Date of Filing: 19-Dec-2024**

Title: BETA CARBOLINE ANALOGUES AS SELECTIVE AND BIASED KAPPA OPIOID RECEPTORS AGONISTS FOR TREATING VARIOUS ASSOCIATED PATHOPHYSIOLOGICAL CONDITIONS

Inventors: Sanjay Batra, Prem Narayan Yadav, Veena Yadav, Lalan Kumar, Shalini Dogra, Poonam Kumari, Ajeet Kumar, Adilakshmi Vutla

US Patent Application No. 18/993698 **Date of Filing: 13-Jan-2025**

Title: SUBSTITUTED 3-METHYLBENZO[D]THIAZOL-3-IUM COMPOUNDS AND USE THEREOF

Inventors: Atul Goel, Sajiya Parveen, Kundan Singh Rawat, Shradha Goenka

European Patent Application No. 23839191.6 **Date of Filing: 20-Jan-2025**

Title: SUBSTITUTED 3-METHYLBENZO[D]THIAZOL-3-IUM COMPOUNDS AND USE THEREOF

Inventors: Atul Goel, Sajiya Parveen, Kundan Singh Rawat, Shradha Goenka

3 Papers Presented in Scientific Conventions

European Calcified Tissue Society (ECTS-2024), Marseille, France, 22-26 May 2024

- Novel Pyrimidine Derivative (18a) Prevents Glucocorticoid-Induced Osteoporosis through Upregulation of Autophagy and PINK1/PARKIN-Mediated Mitophagy. Sonu Khanka, Krishna Bhan Singh, Sumit K. Rastogi, Kriti Sharma, Ravindra Kumar, Divya Singh

Asia-Pacific Worm Meeting, Bangalore, 13-16 June 2024

- Neuroprotective Effects of *Desmodium giganticium* Extract in *Caenorhabditis elegans* Models of Parkinson's Disease. Pratyush Kumar Pradhan, Richa Pandey, Sonia Verma
- Unveiling the Genes and Pathways that are Dysregulated in Dopaminergic Neurons during both Familial and Sporadic Parkinson's Disease. Sonia Verma
- Unveiling Marine Bacteria as a Source of Novel Neuroprotective Agents for Parkinson's Disease. Simran, Sonia Verma

35th Molecular Parasitology Meeting, Marine Biological Laboratories (MBL), Woods Hole, Massachusetts, USA, 15-19 September 2024

- Biochemical Characterization and Subcellular Localization of an Exonuclease with a Putative Role in Mitochondrial DNA Repair in the Malaria Parasite. Shivani Mishra, Saman Habib
- Phospholipid Substrate Binding and Subcellular Localization of Putative Mitochondrial Cardiolipin Synthase in the Malaria Parasite. Karavadra Asha Adhur, Saman Habib
- Biochemical Characterization and Sub-cellular Localization of an Exonuclease with a Putative Role in Mitochondrial DNA Repair in the Malaria Parasite. Tribeni Chatterjee, Anupama Tiwari, Saman Habib

Annual Molecular Parasitology Meeting XXXV, Woods Hole, MA, USA, 18 September 2024

- A Plasmodium Hypothetical Protein is Critical for the Efficient Transition from Sporozoite to Blood Stages. Nandi R, Mishra S
- *Plasmodium berghei* IMP4 is Critical for the Parasite Transmission in Mosquitoes. Mehra P, Mishra S

Advancements in Basic Science, Environmental Studies, and Traditional Medicine for Translational Drug Discovery and Development (TMT3D), Banaras, 21-23 September 2024

- Herbal Raw Material Authentication Based on Mass Spectrum Fingerprint Utilizing a Digital Library of Indian Medicinal Plants and Their Metabolites. Akhilesh Kumar, D. K. Mishra, Sanjeev Kanojiya

PhD café- 'A virtual Seminar series for PhD researchers in India', Virtual, 23-27 September 2024

- Lactational Osteo miRNA Plays a Crucial Role in Bone Formation. Anirban Sardar, Ritu Trivedi

XIX J-NOST Conference, IIT Gandhinagar, Gandhinagar, 07-09 October 2024

- Discovery of New "Turn-on" NIR Fluorescent Probe for Selective Detection of DNA/RNA G-quadruplex and its Biomedical Applications. Suchitra Gupta, Sajiya Parveena, Nirupa Chaurasia, Seema Vidyarthi, Nisha Gupta, Priyanka Pandey, Bhaskar Pant, Kinshuk Raj Srivastava, Niti Kumar, Atul Goel

International Conference on Current Trends in Toxicology & 43rd Annual Meeting of Society of Toxicology (STOX), Lovely Professional University, 16-18 October 2024

- Deoxynivalenol Exposure in Undernourished Rats: Mechanisms and Toxicological Implications. Sakshi Mishra, Divyansh Sharma, Gaurav Jha, Bhawana Tomar, S. K. Rath

32nd National Congress of Parasitology, jointly organized by IISER, NCL, SPPU, Pune, and the Indian Society for Parasitology at IISER, Pune, 03-05 November 2024

- An Essential Exonuclease with a Putative Role in Mitochondrial DNA Replication and Repair in the Malaria Parasite. Shivani Mishra, Saman Habib
- Binding of Putative Mitochondrial Cardiolipin Synthase with Phospholipids and its Subcellular Localization in the Malaria Parasite. Karavadra Asha Adhur, Niti Kumar, Saman Habib
- Functional Significance of an Internal Low Complexity Region (LCR) in a Novel Apicoplast-directed *Plasmodium falciparum* Exonuclease/Flap Endonuclease. Tribeni Chatterjee, Anupama Tiwari, Saman Habib
- Interaction Between Mitochondrial [Fe-S]/S-Intermediate Transporter and CIA Pathway Components in *Plasmodium falciparum*. Jadhav Prasad Ramchandra, Deepti Shrivastava, Saman Habib
- Plasmodium Actin-Like Proteins are Essential for DNA Segregation During Male Gametogenesis and Malaria Transmission. Varshney A, Nirdosh, Pandey E, Mishra S
- Plasmodium Malonyl-CoA-acyl Carrier Protein Transacylase is Essential for Apicoplast Biogenesis and Late Liver Stage Development. Devi R, Mishra S
- The Multifunctional Autophagy Pathway as a Potential Drug Target for Malaria. Rajput S, Mishra A, Srivastava PN, Ali HS, Mishra S
- Decoding the Interaction Between Innate Lymphoid Cells

Type 2 (ILC2) and Eosinophils during Tropical Pulmonary Eosinophilia. Rahul Roy, Shweta Tiwari, Shikha Yadav, Amit Kumar Shahravat, Mrigank Srivastava

International Conference on Advances in Mechanisms and Approaches to Neuro-Therapeutics (AIM-AT) AND XLII Annual Meeting of the Indian Academy of Neurosciences 2024, Bangalore, 12-14 November 2024

- Neuroprotective Effects of *Desmodium giganticium* Extract in *Caenorhabditis elegans* Models of Parkinson's Disease. Pratyush Kumar Pradhan, Richa Pandey, Sonia Verma
- Exploring the Neuroprotective Potential of Marine Bacteria: A Focus on Parkinson's Disease. Simran, Sonia Verma
- Investigation of D-Galactose-Induced Brain Ageing Through Various Routes and Their Behavioral Effects in Swiss Mice. Sachin Kumar, Sachi Bharti, Kanika, Shubha Shukla

5th Science Conclave cum National Biomedical Research Competition, New Delhi, 01-03 December 2024

- Evaluation of Small-Molecule AdipoR Agonist in Skeletal Muscle Atrophy. Shubhrajyoti Das, Sabyasachi Sanyal
- Evaluation of an AdipoR1 Selective Agonist for its Myogenic and Therapeutic Potential Against Skeletal Muscle Atrophy. Md Rameez Moin, Sabyasachi Sanyal
- Apigenin-6-C-glucoside Ameliorates MASLD in Rodent Models via Selective Agonism of Adiponectin Receptor 2. Shamima Khatoon, Nabanita Das, Sourav Chattopadhyay, Amit Joharapurkar, Abhinav Singh, Vishal Patel, Abhishek Nirwan, Akhilesh Kumar, Madhav Nilakanth Mugale, Durga Prasad Mishra, Jagavelu Kumaravelu, Rajdeep Guha, Mukul Rameshchandra Jain, Naibedya Chattopadhyay, Sabyasachi Sanyal
- Pym-18a, a Novel Pyrimidine Derivative, Ameliorates Glucocorticoid-Induced Osteoporosis through Autophagy and PINK1/Parkin-Mediated Mitophagy Induction. Sonu Khanka, Krishna Bhan Singh, Sumit K. Rastogi, Kriti Sharma, Ravindra Kumar, Divya Singh
- Palmitic Acid-induced Oxidative stress, Insulin resistance and Osteoblast Dysfunction in Adolescent Bone Health through Wnt/ β-catenin Dysregulation. Kunal Chutani, Ritu Trivedi
- Nuclear Receptor-related-1 Protein (NR4A2/Nurr1) Activation Improves Behavioral Deficits and Mitochondrial Network Maintenance in Rodent Model of Parkinson's Disease. Kumari Alka, Parul, Sachin Kumar, Animesh Singh, Shubha Shukla

Conference on Engineering in Medicine, IIT Kanpur, 6-8 December 2024

- Regenerative Efficacy of Mesenchymal Stem Cells to Restore Dysfunctional Ovaries. A Kumari, V Tyagi, R. Mishra, D Singh, SK Agnihotri, A Vyas, N Kumar, M Sachdev
- Stem Cells Can Regenerate the Chemo-ablated Dysfunctional Testes. A Negi, R. Mishra, V Tyagi, A Kumari, D Singh, A Vyas, M Sachdev
- Development and Characterisation of Protein-Protein Interaction Target(s) and Analyses of Inhibitor Using Mammalian Two-Hybrid Model. Shriyanshi Mishra, Yogesh Sarbariya, Mohammad Imran Siddiqi, Raj Kamal Tripathi

Advances in Biological Sciences: From Molecules to Organisms, Aligarh, UP, 27-29 December 2024

- Discovery of a Small Molecule Adiponectin Receptor Agonist for First-in-Class Therapy Against Metabolic Diseases/Disorders. Dr. Sabyasachi Sanyal

International Conference on Chemistry for Human Development (ICCHD), Kolkata, 04-06 January 2025

- Development of New Fluorescent Dyes for Hypochlorite Ion Sensing. Nisha Gupta, Sajiya Parveen, Suchitra Gupta, Atul Goel
- Donor-Acceptor Fluorescent Dyes for Selective Staining of Lipid Droplets. Aradhana Chauhan, Chandra P. Sharma, Akanksha Vyas, Monika Sachdev, Atul Goel
- Molecular Platform Technology for the Development of RT-PCR-based Diagnosis of Viral Infections. Parveen Kumar Yadav, Priyanka Pandey, Ashish Arora, Niti Kumar, Atul Goel

7th Regional Science & Technology Congress, Burdwan, West Bengal, 10 January 2025

- Plasmodium Sporozoite Invasion Protein (SIP) Plays a Critical Role During Sporozoite Infection of the Mammalian Liver. Nandi R, Mishra S

Scientific Hindi Seminar cum Workshop, Lucknow, 10 January 2025

- सराका अशोका (*Saraca asoca*) की न्यूरोप्रोटेक्टिव क्षमता का निरूपण और उसके रासायनिक मार्कर्रों का पृथक्करण। Shilpa Yadava, Hariom, Roli Verma, Sachi Bharti, Shubha Shukla, Vineeta Tripathi, Richa Pandey

Vellore Endocrinology International Congress 2025, Christian Medical College, Vellore, 10-11 January 2025

- Targeting NOD2 Signaling for the Management of Skeletal Muscle Atrophy by Small Molecules. Chhikara N, Ansari A, Kumar P, Gulzar F, Sashidhara KV, Tamrakar AK
- High Glucose-Mediated Expression of PRMT4 Contributes to Skeletal Muscle Atrophy. Kumar P, Gulzar F, Chhikara N, Tamrakar AK
- Evaluation of Antiglycation-driven Nephroprotection by a Bioflavonoid Mixture for the Management of Diabetic Nephropathy. Baghel R, Maurya AK, Kanojia S, Tamrakar AK

International Symposium on Recent Advances in Disease Biology and Emerging Therapeutics (RADBET), BHU, Varanasi, 17-19 January 2025

- Evaluation of Novel Bergenin Amide Derivatives as Therapeutic Agents for Senile Osteoporosis. Devendra Pratap Singh, Vikrant Nawal Vikram, Ankita Paul, Saurabh Kumar Kaushal, Amar Deep Lakra, Madhav N Mugale, T

Narendra, Divya Singh

- Evaluation of Small-Molecule AdipoR Agonist in Skeletal Muscle Atrophy. Shubhrajyoti Das, Sabyasachi Sanyal
- Evaluation of an AdipoR1 Selective Agonist for its Myogenic and Therapeutic Potential Against Skeletal Muscle Atrophy. Md Rameez Moin, Shubhrajyoti Das, Sabyasachi Sanyal
- Apigenin-6-C-Glucoside Ameliorates MASLD in Rodent Models via Selective Agonism of Adiponectin Receptor-2. Shamima Khatoon, Nabanita Das, Sourav Chattopadhyay, Amit Joharapurkar, Abhinav Singh, Vishal Patel, Abhishek Nirwan, Akhilesh Kumar, Madhav Nilakanth Mugale, Durga Prasad Mishra, Jagavelu Kumaravelu, Rajdeep Guha, Mukul Rameshchandra Jain, Naibedya Chattopadhyay, Sabyasachi Sanyal
- Palmitic Acid-Induced Oxidative Stress, Insulin Resistance, and Osteoblast Dysfunction in Adolescent Bone Health through Wnt/β-Catenin Dysregulation. Kunal Chutani, Ritu Trivedi
- Characterization of POTE-Paralogs as Cancer Germline Antigens in Cervical Cancer. N Kumar, R Sahu, A Vyas, S Agnihotri, D Singh, R K Mishra, A Kumari, MLB. Bhatt, R Gupta, K Srivastava, M Verma, R Sachan, M Sachdev

Host and Pathogen Heterogeneity in Tuberculosis, Hyderabad, 09-12 February 2025

- A Study of Antibiotic-Induced Endogenous ROS Production in *Mycobacterium tuberculosis* Using Promoter-Reporter Assay. Swati Anand, Sarah Fatima, Manju Y Krishnan
- Effects of Downregulation of Oligoribonuclease (Orn) on Biofilm Formation and Stress Response of *Mycobacterium smegmatis*. Sarah Fatima, Swati Anand, Manju Y Krishnan
- Exploring the Physiological Role of DusB in *Mycobacterium tuberculosis*. Deepabali Ghosal, Manju Y Krishnan

World Congress on Translational Cancer Research and Immunotherapy, MG Medical College and Hospital, Jaipur, 10–12 February 2025

- Overexpression of KHDC3L can mark the Existence of Cervical Cancer. R Sahu, A Vyas, N Kumar, R Gupta, K Srivastava, M Verma, MLB Bhatt, R Sachan, M Sachdev
- Cancer Germline Antigen (CGA)-SAS1 B Targeted for Early Detection of Cervical Cancer. A Vyas, S Agnihotri, A Jain, N Kumar, R Sahu, D Singh, V Tyagi, R Mishra, A Kumari, MLB.Bhatt, K Srivastava, R Gupta, R Sachan, M Sachdev

International Conference on Reproductive Biomedicine: Integrating Basic Biological and Applied Research into Clinical Practice for Human Welfare, Dr. B. Lal Institute of Biotechnology, Jaipur, 14–16 February 2025

- Therapeutic Efficacy of Adult Stem Cells to Restore Ovarian Insufficiency in Rat Model. A. Kumari, V. Tygi, R. Mishra, D. Singh, A. Negi, N. Yadav, M. Sachdev

9th Current Trends in Drug Discovery Research, CSIR-CDRI, Lucknow, 19-22 February 2025

- Development and Characterisation of Protein-Protein Interaction Target(s) and Analyses of Inhibitor Using Mammalian Two-Hybrid Model. Shriyanshi Mishra, Yogesh Sarbariya, Mohammad Imran Siddiqi, Raj Kamal Tripathi
- Phytochemical Investigation and Lead Optimization of Myricanol Isolated from *Myrica esculenta* for Neuroprotective Activities. Ehtesham Jameel, Asif Ali
- Antiepileptic Drugs Impair Bone Quality and Osteocyte Function in Young Adult Rats: a Focus on Cellular and Compositional Detriment. Sreyanko Sadhukhan, Saroj Kumar, Navin Kumar, Naibedya Chattopadhyaya
- Functional Expansion and Diversification of HSP40s in Human Malaria Parasite. Seema Vidyarthi, Shagufa Nusrat Noorie, Akash Pandeya, Niti Kumar
- An Open-Air Palladium-Catalyzed Stereoselective O-Glycosylation of Glycals via *In-Situ* Generation of gem-Disubstituted Methanols from p-Quinone Methides. Shashiprabha Dubey, Zanjila Azeem, Sk Areful Islam, Pintu Kumar Mandal
- Stereoselective Organocatalyzed Glycosylation of Glycosyl Trichloroacetimidate Donors: Thiouracil as Brønsted Acid Catalyst. Ashwani Tiwari, Ariza Khanam, Mohan Lal, Pintu Kumar Mandal
- The Inhibitory Effect of One Pot Synthesized 2-iodo-2-deoxy Nucleosides from Unprotected Nucleobases and Glycals on Japanese Encephalitis Virus. Km. Archana, Norein Sakander, Ajaz Ahmed, Shriyanshi Mishra, Raj Kamal Tripathi, Debaraj Mukherjee
- Interleukin-1 Receptor Associated Kinase Mediates Angiotensin II-induced Cardiac Hypertrophy by Regulating NF-$\kappa\beta$ and TGF-β pathway. Shreya Jaiswal, Gaurav Sharma, Manoj Kumar Barthwal
- Effect of Sodium Butyrate on High-Fat Diet-Induced Fatty Liver Disease. Gaurav Sharma, Shreya Jaiswal, Kumaravelu Jagavelu, Manoj Kumar Barthwal
- Development of Naphthalimidehydrazide Derivatives as Potent Antibacterial Agents Against Carbapenem-Resistant *A. baumannii.* Rahul Maitra, Preeti Rana, Deepanshi Saxena, Abdul Akhira, Manasa Vadakattu, Abdul Kalam, Swanand Vinayak Joshi, Ramulu Parupalli, Vasundhra Bhandari, Y. V. Madhavi, Arunava Dasgupta, Sidharth Chopra, Srinivas Nanduri
- Polycationic Phosphorus Dendrimer Potentiates Multiple Antibiotics Against Drug-Resistant Mycobacterial Pathogens. Pradip Malik, Mohmmad Imran, Shriya Singh, Mohammad Naiyaz Ahmad, Atri Mukhopadhyay, Umesh D Gupta, Kalyan Mitra, Sidharth Chopra, Serge Mignani, Jean-Pierre Majorale, Arunava Dasgupta

- Inhibition of Mitochondrial Citrate Transporter SLC25A1 Improves Dextran Sulfate Sodium (DSS)-Induced Colitis in Mice Model. Swarnali Basu, Milind Nahiyera, Uday C. Ghoshal, Amit Lahiri
- Targeting the NS5 Protein of JEV: A Structure-Based Drug Development Approach. Preeti Mishra, Km. Archana, Gaurava Srivastava, M.I. Siddiqui, Babita Bohra, Rajkamal Tripathi
- Host-Cell Plasma Membrane-Derived Vesicles: A Novel Antiviral Strategy Against Influenza Virus. Bushra Qazi, Vaishali Vishwakarma, Vishal Kumar, Raj Kamal Tripathi, Sourav Haldar
- Pancreastatin Inhibitor PSTi8 Improves Ovarian Health in Letrozole-HFD Induced PCOS Rats. Shubhi Yadav, Shailesh Dadge, Richa Garg, Umesh K. Goand, Arun Agarwal, Divya Chauhan, Jiaur R. Gayen
- Bacterial Rps3 Counters Oxidative and UV Stress by Recognizing and Processing Ap-Sites on mRNA via a Novel Mechanism. Faiz Ali, Mohammad Afsar, Ankita Shukla, Rahul Maurya, Suman Bharti, Neelam Kumar, Mohammad Sadik, Surabhi Chandra, Huma Rahil, Sanjay Kumar, Imran Ansari, Farheen Jahan, Saman Habib, Manju Yasoda Krishnan, Ravishankar Ramachandran
- Structure-Guided Analysis of NusA: NusG Interaction in *Mycobacterium tuberculosis* and its Therapeutic Significance. Imran Ansari, Faiz Ali, Ravishankar Ramachandran
- EZH2-H3K27me3-Mediated Silencing of Claudin-4 Promotes Intrahepatic and Pulmonary Metastasis in HCC by Activating the Wnt/β-catenin Signaling Pathway. Smriti Verma, Shobhit Verma, Manisha Yadav, Kaveri Washimkar, and Madhav, Nilakanth Mugale
- Inhibition of SARS-CoV-2 Entry via the Clathrin Dependent Pathway by Arresting the ACE2-RBD Complex Using an Umifenovir-Derived Compound. Raja Mani Tripathi, Hira Singh Gariya, Ravishankar Ramachandran
- Design and Synthesis of a Novel Phenothiazine-Quinolinium-based "turn-on" Fluorescent Probe for Selective Detection of Hypochlorite Ion. Nisha Gupta, Sajiya Parveen, Suchitra Gupta, Atul Goel
- Age and Geographic Variance in Epigenetic Regulation of Longevity in *C. elegans.* Stanzin Nurboo, Anam Naseer, Aamir Nazir
- Structural and Biochemical Insights into SARS-CoV-2 Helicase for Antiviral Drug Development. Anurag Singh, Hira Singh Gariya, Ravishankar Ramachandran
- Impact of SOX-2 Modulation on Ageing and Neurodegeneration in *Caenorhabditis elegans*. Sonam Ranwa, Aamir Nazir
- Studies on the Biological Functions of Human POTEE Protein in Cancer Cells Using a Recombinant Approach. Smriti Verma, Shobhit Verma, Manisha Yadav, Kaveri Washimkar, Madhav Nilakanth Mugale
- PTH 1-34 Counteracts Deleterious Impact of Palmitic Acid on Bone: From Saturation to Salvation. Anirban Sardar, Ritu Trivedi
- Identification of Novel Glucocorticoid-Responsive Gene in Regulating Chondrocyte Hypertrophy. Shikha Verma, Ritu Trivedi
- Role of Glia-Enriched PTR-10 and Its Downstream Targets in Age-Related Neurodegeneration and Neuroprotection. Sakshi Yadav, Rohil Hameed, Aamir Nazir
- Characterization and Inhibition of NendoU Endoribonuclease Activity: Insights into Biochemical Parameters underlying Replication Machinery and Small-Molecule Inhibitors for Targeted Antiviral Therapies against SARS-CoV-2. Hira Singh Gariya, Raja Babu Mani Tripathi, Anurag Singh, Ravishankar Ramachandran
- Gut Microbiota-Derived Succinate Exacerbates Parkinson's Disease Pathology, Modulates Proteostasis and Impacts Longevity in *C. elegans.* Mahmood Akbar, Sakshi Yadav, Anam Naseer, Rohil Hameed, Arunabh Sarkara, Aamir Nazir
- Synthetic Short Cryptic Antimicrobial Peptides as Templates for the Development of Novel Biotherapeutics Against the WHO Priority Pathogen. Manjul Lata, Vrushti Telang, Pooja Gupta, Garima Pant, Mitra Kalyan, Jesu Arockiaraj, Mukesh Pasupuleti
- 3,4-Dicyano-2,5,6-Trifluorophenyl Glycosides as Electron-Deficient Fluoroarene Glycosyl Donors for Chemical Glycosylation. Mohan Lal, Ariza Khanam, Ashwani Tiwari, Mohammad Ovais, Pintu Kumar Mandal
- Pd-catalyzed Synthesis of 1-(Hetero)aryl Thioglycosides: Strategy for Trapping Acyl Group of Glycosylthioesters by Coupling bis-Electrophilic-Nucleophilic Partners. Zanjila Azeem, Shashiprabha Dubey, Pintu Kumar Mandal
- Role of Cellular Differentiation and Metabolic Reprogramming in Hepatic Fibrogenesis. Manisha Yadav, Kaveri Washimkar, Shobhit Verma, Smriti Verma, Madhav Nilakanth Mugale
- Synthesis of Aryl Thioglycosides by Metal-Free Arylation of Glycosyl Thiols with Diaryliodonium Salts Under Basic Conditions. Anand Gaurav, Pintu Kumar Mandal
- Synergistic Approaches Towards Cellular Resistance Against Cisplatin and Olaparib in Ovarian Cancer. Anjna Sahu, Ravishankar Ramachandran, Ravi Sankar Ampapathi
- Antitubercular Evaluation of Dihydropyridine-Triazole Conjugates: Design, Synthesis, *In Vitro* Screening, SAR and *In Silico* ADME Predictions. Hemlata Bhatt, Ajay Kishor Kushawaha, Koneni V. Sashidhara

- Unveiling Marine Bacteria as a Source of Novel Neuroprotective Agents for Parkinson's Disease. Simran, Sonia Verma
- Tandem Mass Spectrum Database: An Open-Access MS/MS Library of Naturally Occurring Compounds (Utility and Applications). Akhilesh Kumar, Santosh Shukla, Rabi Sankar Bhatta, Sanjeev kanojiya
- Interaction Between Mitochondrial (Fe-S)/S-Intermediate Transporter and CIA Pathway Components in *Plasmodium falciparum*. Jadhav Prasad Ramchandra, Deepti Shrivastava, Saman Habib
- CaMKII Phosphorylation Drives Renal Fibrosis in Cisplatin-Induced Chronic Kidney Disease. Bhawna Tomar, Gaurav Jha, Divyansh Sharma, Sakshi Mishra, Srikanta Kumar Rath
- Role of Testosterone on Oxidative Stress and Mitochondrial Dynamics in Liver-Induced Rats. Shobhit Verma, Kaveri R. Washimkar, Manisha Yadav, Smriti Verma, Madhav Nilakanth Mugale
- LetM1 Transporter of *Plasmodium falciparum* is Localizes to Mitochondrion and Interacts with Iron and Zinc Ions. Karavadra Asha Adhur, Saman Habib
- NUO-5 as a Regulator of Mitochondrial Integrity in Alzheimer's Disease: Evidence from *Caenorhabditis elegans*. Pranoy Toppo, Arunabh Sarkar, Aamir Nazir
- Role of *Plasmodium falciparum* Dynamin Protein Middle Domain in Membrane Interaction. Siddhanta, Amanullah Sayeeda, Nivedita Gupta, Vishal Kumar, Garima Pant, Kalyan Mitra, Sourav Haldar, Niti Kumar
- USP10 Deubiquitinates and Stabilizes CD44 Leading to Enhanced Breast Cancer Cell Proliferation, Stemness and Metastasis. Arppita Sethi, Shivkant Mishra, Vishal Upadhyay, Parul Dubey, Shumaila Siddiqui1, Anil Kumar Singh, Sangita Chowdhury, Swati Srivastava, Pragya Srivastava, Prasannajit Sahoo, Madan L. B. Bhatt, Anand Mishra, Arun Kumar Trivedi
- Access to Indoline-Based Metacyclophanes via C-H Activation under the Ru(II)-Catalysis. Abhishek Kumar Shaw, Dipankar Koley
- Phytochemical Investigation of *Boswellia serrata* Oleogum Resin and their Potential Role to Combat Neurodegenerative Disorders. Jay Gupta, Anuradha Vishwakarma, Pranoy Toppo, Mahmood Akbar, Aamir Nazir, Koneni V Sashidhara
- Phytochemical Investigation and Therapeutic Potential of Saponin-enriched Fraction from *Solanum virginianum* L. against Non-Alcoholic Fatty Liver Disease. Anuradha Vishwakarma, Jay Gupta, Ambalika Gond, Kumaravelu Jagavelu, Koneni V Sashidhara
- MiR-539-3p Downregulates Osteoblast Differentiation by Targeting LRP6/Wnt β-Catenin Signaling & Subsequent Inhibition of Akap-3. Megha Dixit, Alok Tripathi, Aijaz A John, Saurabh Kumar Kaushal, Devendra Pratap Singh, Divya Singh
- Integrative Methylome and Transcriptome Analyses Reveal Key Ageing Genes in *Caenorhabditis elegans*. Anam Naseer, Ayesha Sanober, Mahmood Akbar, Pranoy Toppo, Sakshi Yadav, Aamir Nazir
- KAT5 Acetylation of PC4 and Its Implications in DNA Repair and Cancer. Aayushi Agrawal, Sweta Sikder, Siddharth Singh, Rakesh Kumar Sharma, Nikhil Pallaprolu, Kalyan Mitra, Sourav Mondal, Rupa Mukhopadhyay, Jayanta Sarkar, Ramalingam Peraman, Ravichandran Velayutham, Tapas K. Kundu
- Exploring the Physiological Role of DusB in *Mycobacterium tuberculosis*. Deepabali Ghosal, Manju Krishnan
- Characterization of Flavonoid-enriched Fraction from *Oxystelma esculentum* Using Liquid Chromatography-Mass Spectrometry and its Osteogenic Properties. Arvind Kumar Maury, Kirti Sharma, Priyanka Rawat, Dipak K. Mishra, Divya Singh, Sanjeev Kanojiya
- Exploring Preclinical Pharmacokinetics of FDA-Approved Anti-Cancer Drugs through Simultaneous LC-ESI-MS/MS Quantification. Shailesh D. Dadge, Shubhi Yadav, Sharib Khan, Jiaur R. Gayen
- *Litsea glutinosa* Extract Enhances Fracture Healing and Prevents Bone Loss Through Activation of BMP2/Smad1 Signaling. Ankita Paul, Sonu Khanka, Kriti Sharma, Dinesh Kumar Yadav, Divya Singh
- A Hallimane Diterpene from *Polyalthia longifolia* Targets Adipogenesis by Inhibiting Mitotic Clonal Expansion and Ameliorates Dyslipidemia in HFD-fed Golden Syrian Hamster. Astha Singh, Nilesh Khandelwal, Alka Raj Pandey, Suriya Pratap Singh, Prashant Rai, Sanchita Gupta, Kushwaha Vinita, Koneni V. Sashidhara, Anil Nilkanth Gaikwad
- Cardiac Glycosides Biosynthesis Investigation in *Nerium oleander* L. Through Transcriptome and Metabolome Analysis. Sandhya Prajapati, Renu Nimoriya, Yatendra Singh, Sanjeev Kanojiya, Dipak Kumar Mishra, Vineeta Tripathi
- Discovery of A PDE4 Inhibitor that Enhances Bone Formation without Stimulating Bone Resorption in Postmenopausal Osteoporosis. Moh Farman Abbasi, Konica Porwal, Imran Siddiqui, Naibedya Chattopadhyay, Sanjay Batra
- An Efficient Strategy for the Synthesis of Nintedanib. Souvik Barman, Saroj Maji, Gautam Panda
- Corannulene Amino Acid-Derived Water-Soluble Amphiphilic Buckybowls as Broad-Spectrum Membrane Targeting Antibacterial Agents. Sabyasachi Halder, Saroj Maji, Sariyah Akhtar, Indranil Chatterjee, Devesh Pratap Verma, Neeraj

Kumar Verma, Jyotshana Saroj, Deepanshi Saxena, Gautam Panda, Hidehiro Sakurai, Kalyan Mitra, Sidharth Chopra, Jimut Kanti Ghosh, Rahul Maitra, Juhi Sharma, Bhawana Sharma

- Evaluation of Dual Small Molecule AdipoR Agonist in Skeletal Muscle Atrophy. Shubhrajyoti Das, Sabyasachi Sanyal
- Unraveling the Role of LAMP3 as a Key Modulator of Autophagy in Breast Cancer Drug Resistance. Rohit Singh Rawat, Priya Halder, Dibyendu Banerjee
- Design, Synthesis and Biological Evaluation of (Quinazoline 4-yloxy)acetamide and (4-Oxoquinazoline-3(4H)-yl)acetamide Derivatives as Inhibitors of *Mycobacterium tuberculosis* bd Oxidase. Sandeep Bhattacherjee, Amit Kumar, Neetu Kumari, Umamageswaran Venugopal, Shahid Parwez, Mohammad Imran Siddiqi, Manju Y. Krishnan, Gautam Panda
- Effects of Downregulation of Oligoribonuclease (Orn) on Biofilm Formation and Stress Response of *Mycobacterium smegmatis*. Sarah Fatima, Swati Anand, Manju Y Krishnan
- Base-Assisted and Silica Gel-Promoted Indole Substituted Indene Synthesis. Anurag Verma, Ruchir Kant, Nayan Ghosh
- Synthesis and Bio-evaluation of Quaternized Fused-β-carbolines as anti-MRSA Agents. Adilakshmi Vutla, Deepanshi Saxena, Rahul Maitra, Sidharth Chopra, Sanjay Batra
- Pyrroloquinoline Quinone Supplementation Prevents Pulmonary Inflammation and Limits Ultrafine Carbon Particle-Induced Emphysema. Mohit Barsain, Sarita Yadav, Rifat Praveen, Kusum Devi, Kashif Hanif, Baisakhi Moharana
- A Study of Antibiotic-Induced Endogenous ROS Production in *Mycobacterium tuberculosis* Using Promoter-Reporter Assay. Swati Anand, Sarah Fatima, Manju Y Krishnan
- A Natural Anthraquinone Derivative and Topoisomerase I Inhibitor Disrupts Nuclear Integrity by Damaging Nuclear Envelope Protein LaminB1, Leading to Nucleophagy-Mediated Cell Death in Triple-Negative Breast Cancer Cells. Nishakumari C Singh, Nisha Yadav, Rakesh Kumar Sharma, Pragya Gupta, Jayanta Sarkar, Kalyan Mitra
- Cisplatin Potentiates Induction of Immunogenic Cell Death by Ormeloxifene Hydrochloride in Non-Small Cell Lung Carcinoma. Rakesh Kumar Sharma, Priya Saha, Nishakumari Chentunarayan Singh, Deepak Kumar, Dipak Datta, Jayanta Sarkar, Kalyan Mitra
- Characterisation of Role of *Vibrio cholerae* RNA Polymerase Holoenzyme Complex with Alternate Sigma Factors in Bacterial Differential Gene Expression. Abdul Basit Khan, Shivam Sahu, Pragati Agnihotria, J. Venkatesh Pratap
- MLKL Inhibition Ameliorates Experimental Cardiac Hypertrophy. Smita Prajapati, Nabeel Ahmad, Rifat Parveen, Kashif Hanif
- Elucidating the Effect and Mechanism of Striatal Dopamine Receptors (DRD5/DRD1) Role in Motor Function and Cognition. Kajal Sharma, Sakesh Kumar, Prem N Yadav
- Catalytic Enantioselective Synthesis of Aryl-Methyl Organophosphorus Compounds. Dileep Kumar, Arun Yadav, Chandra Bhushan Tripathi
- Unveiling the Crystal Structure of Hv1 Channel in Apo and Ligand-Bound States: Opportunities for Therapeutics. Shivani Yadav, Aravind Singh Kshatri
- A typical ERK3 is Associated with Endometrial Receptivity in Mouse Model. Ajaykumar K. Kawale, Rajesh K. Jha
- Unveiling the Role of Quaking Circular RNAs in Cardiac Remodeling and Pathology. Renu Kumari, Shashi Kumar Gupta
- Neuroprotective Effects of *Desmodium giganticium* Extract in *Caenorhabditis elegans* Models of Parkinson's Disease. Pratyush Kumar Pradhan, Richa Pandey, Sonia Verma
- ppm-Level Iridium Catalysis en Route to Chiral β-Amino Alcohols. Suresh Kumar, Soumen Pandit, Amit Singh Adhikari, Nilanjana Majumdar
- Inhibition of NOD2 Signaling by Small Molecules: A Potential Approach for Managing Skeletal Muscle Atrophy. Nikita Chhikara, Alisha Ansari, Pawan Kumar, Farah Gulzar, KV Sashidhara, Akhilesh K. Tamrakar
- Understanding the Role of RBR-E3 Ligase in Regulation of Cellular Homeostasis in Human Malaria Parasite. Varsha Kumari, Seema Vidyarthi, Aradhya Tripathi, Nirupa Chaurasia, Niharika Rai, Richa Shukla, Shagufa Nisrat Noorie, Girdhar Bhati, Simmi Anjum, Niti Kumar, Mohammad Anas, Shakil Ahmed
- Synthesis of Bridged Aza Polycyclic Scaffold from Enone Tethered Cyclohexadienones via Aza-Michael-Michael Cascades. Akhilesh Yadav, Anil Chauhan, Raj Kumar Patel, Ravindra Kumar
- Calcium-Dependent Cysteine Proteases are Associated with Polycystic Ovary Syndrome. Akanksha Singh, Rupal Tripathi, Rajesh Kumar Jha
- Design and Synthesis of New "Turn-on" NIR Fluorescent Probe for Selective Detection of DNA/RNA G-Quadruplex. Suchitra Gupta, Kinshuk R. Srivastava, Niti Kumar, Atul Goel
- Electrochemical Nickel-Catalyzed C-N Double Bond Isomerization Triggered Intramolecular Amination of Aryl Chlorides. Deepak Bhadoria, Rajesh Kumar, Ruchir Kant, Kinshuk Raj Srivastava, Atul Kumar
- Development of Novel Phthalazinone-Triazole Hybrids as Potential Antidiabetic Agents Targeting GLUT4 Translocation in Skeletal Muscle. Poonam Yadav, Ajay Kishor Kushawaha, Akhilesh K. Tamrakar, Koneni V. Sashidhara

- 3'-5' Exonuclease is Essential for the Completion of the Life Cycle of Malaria Parasite. Pragya Mehra, Satish Mishra
- A Novel Plasmodium Protein, PEPT, is Critical for Maintaining Sporozoite Shape and Infectivity. Plabita Paul, Satish Mishra
- Elucidating the Role of Base Excision Repair Enzymes in Organellar Genome Maintenance of the Malaria Parasite. Himadri Shukla, Satish Mishra
- Discovery and Development of Novel Selective TRPA1 Inhibitors for Treatment of Chronic Pain. Priyanka Yadav, Asif Ali, Aravind Singh Kshatri
- Evaluation of Renoprotective Effect of S021-201 for the Management of Diabetic Nephropathy. Rahul Baghel, Shadab Ahmad,Sarita Katiyar, K.V. Sashidhara, Akhilesh K. Tamrakar
- Therapeutic Efficacy of Mesenchymal Stem Cells to Restore Dysfunctional Ovaries. Arti Kumari, Vaishali Tyagi, Rajnikant Mishra, Neeru, Monika Sachdev
- Targeting the RAS-mSIN1 Interaction: Development of Competitive RAS-Binding Aza-Peptides for Selective mTORC2 Inhibition and Breast Cancer Metastasis. Narayan Kumar, Moinuddin, Usmani Mohammad Akif, Javed Miyan, Smrati Bhadauria
- Plasmodium DNA ligase I is Essential for DNA Replication and Liver Stage Development. Eisha Pandey, Aastha Varshney, Satish Mishra
- Unravelling the Crosstalk Between Sodium Channels and Opioid Receptors. Madhavi Ranawat, Aravind Singh Kshatri
- 5-HT2C Receptor Modulates Neural Stem Cells (NSCs) Homeostasis *In Vitro* and *In Vivo*. Annu Yadav, Prem N. Yadav
- B3GNT5 as a Biomarker and Therapeutic Target in Triple-Negative Breast Cancer. Ananya Yadav, Sumaira Qayoom, Vijay Kumar, Dibyendu Banerjee
- Plasmodium Sporozoite Invasion Protein (SIP) Plays a Critical Role During Sporozoite Infection of the Mammalian Liver. Rohini Nandi, Satish Mishra
- A *Plasmodium berghei* Lipase is Critical for the Efficient Egress of Parasites from Hepatocytes. Raksha Devi, Satish Mishra
- IMPA2 Is a Potential Biomarker and Novel Target for Breast Cancer. Apurba Singh, Vijay Kumar, Sumaira Qayoom, Dibyendu Banerjee
- G-Protein Biased Kappa Opioid Receptor Agonist Blocks Chemotherapy-Induced Neuropathic Pain in Mice. Manish K. Dash, Poonam Kumari, Lalan Kumar, Aravind Kshatri, Sanjay Batra, Prem N. Yadav
- Chebulinic Acid Attenuates LPS-Induced Bone Loss in Mice by Ameliorating ROS & Inflammation via Blockage of the NFkβ pathway. Rajat Rathur, Kriti Sharma, Shiv Kumar, Ravi Prakash, Sonu Khanka, Tripti Mishra, T. Narender, Divya Singh
- Genetic Interaction and Functional Studies of ATM, ATR homologue with TOR Complex in Fission Yeast. Monika Deoralia, Lalita Panigrahi, Shakil Ahmed
- Beta-sheet Antimicrobial Peptides with High Therapeutic Index Designed by Employing the Repeats of 5-Mer Segment of Alpha-Helical, Cytotoxic, Bee Venom Peptide, Melittin. Rahul Dev Verma, Sariyah Akhtar, Jyotshana Saroj, Arvind Gupta, Mehmood Ali, Jimut Kanti Ghosh
- Exploring the Potential of Medicinal Plant Transcriptomics in Drug Development. Rosani Kumari Shaw, Carol Janis Bilung, D. K. Mishra, Vineeta Tripathi
- Investigating the Role of Tor Complex in Cellular Homeostasis and Autophagy in Fission Yeast (*S. pombe*). Sushmita Chauhan, Simmi Anjum, Shakil Ahmed
- Nuclear mTORC2 Activation: mSIN1 Redistribution and Transcriptional Regulation in Breast Cancer. Moinuddin, Narayan Kumar, Usmani Mohammad Akif, Smrati Bhadauria
- Osteogenic Effect of an Adiponectin-Derived Short Peptide that Rebalances Bone Remodeling: a Potential Disease-Modifying Approach for Postmenopausal Osteoporosis Therapy. Swati Rajput, Chirag Kulkarni, Shivani Sharma, Manendra Singh Tomar, Shamima Khatoon, Arvind Gupta, Sabyasachi Sanyal, Ashutosh Shrivastava, Jimut Kanti Ghosh, Naibedya Chattopadhyay
- Access to (Z)-β-sulfonylated Olefins Through Efficient Metal-Free Regio- and Stereoselective Intermolecular Difunctionalization of Alkynes. Deepak Bhadoria, Rajesh Kumar, Ruchir Kant, Kinshuk Raj Srivastava, Atul Kumar
- Targeting the Serglycin/CD44 Axis Associated with Cancer Stem Cell Characteristics in Mantle B-cell Lymphoma. Udita Jindal, Jayanta Sarkar, Dipak Datta, Neeraj Jain
- Assessing the role of Nitric Oxide Synthase in Lymphangiogenesis during NAFLD. Ambalika Gond, Abhinav Singh, Kumaravelu Jagavelu
- Immunomodulatory Functions of Natural Spices Molecules Against Brain-Residing Microglia Cells. Kamini Goswami, Mukesh Pasupuleti
- Unravelling the Role and Mechanism of KIF1C in Cardiac Regeneration. Babita Yadav, Himalaya Singh, Kumaravelu Jagavelu
- Metal Ion Selectivity of the *Plasmodium falciparum* ZIP Family Transporter, PfZIPCO. Simmi Pradhan, Deepti Shrivastava, Saman Habib
- Understanding Telomere-Telomerase Dynamics in *Plasmodium falciparum*. Nirupa Chaurasia, Niharika Rai, Niti Kumar

- Synthesis and Biological Evaluation of Imidazo-fused-β-carbolines as Antileishmanial Agents. Aritra Ghosh, Shewta Bisht, Rupa Hansda, Garvita Mishra, Payel Acharjee, Bidyut Purkait, Sanjay Batra
- Pre-immunization with Vector Salivary Protein (VSP) Modulates Host Immune Profile and Induces Protective Immunity in Experimental Lymphatic Filariasis. Rupa Hansda, Garvita Mishra, Payel Acharjee, Shashi Kumar Maurya, Km Poonam Devi, Riya Arora, Bidyut Purkait
- Sir2 (Deacetylase Enzyme) Regulates AmB-induced Oxidative Stress by Epigenetically Regulating G6PDH in AmB-Unresponsive *Leishmania donovani*. Riya Arora, Garvita Mishra, Payel Acharjee, Rupa Hansda, Bidyut Purkait
- Host and Parasite Transcriptomic Profiling in Genetically Attenuated Malaria Parasites. Nirdosh, Sunil Kumar Narwal, Ankit Ghosh, Satish Mishra
- ILC2-Eosinophil Cross-Talk Shapes the Pathogenesis of Tropical Pulmonary Eosinophilia. Rahul Roy, Shweta Tiwari, Shikha Yadav, Amit Kumar Shahravat, Mrigank Srivastava
- Discovery of Novel PI3Kα Inhibitors for Triple-Negative Breast Cancer Using iDCNNPred: An Interpretable Deep Learning Framework. Ravishankar Jaiswal, Girdhar Bhati, Shakil Ahmed, Mohammad Imran Siddiqi
- Cannabidiol Analogue Confers Neuroprotection by Enabling Mitophagy in Ischemic Stroke. Deepak, Rekha Yadav, Rashi Saxena, Durga Prasad Mishra
- Optimizing Antibiotic Dosing in Critically ill Patients with Sepsis: A Pharmacokinetic-Pharmacodynamic Approach. Deepanshu, Satyendra Kumar Sonkar, Vivek V. Bhosale
- Assessment of Liver Fibrosis by Biomarkers Apolipoprotein A1 in Patients of Chronic Alcoholic Liver Disease Patients, Chronic Hepatitis B Patient and Chronic Hepatitis C Patient. Shail Singh, Vivek V. Bhosale
- KOR Agonist Attenuates Psoriatic Dermatitis via IL-23 Pathway. Prachi Dugam, Anubhav Yadav, Prem N Yadav
- Role of TGR5 in Neural Stem Cell Homeostasis. Devanshu Kaushik, Prem N. Yadav
- Pharmacologically Targeting PARP-2 Improves Endometriosis in a Mouse Model by Acting on ILK Signalling. Satish Gupta, Rupal Tripathi, Ajay K Kawale, Akanksha Singh, Raj Kumar Verma, Sudarsan Sarkar, Pushp Lata Sankhwar, Vanisha Sharma, Rajesh Kumar Jhaa
- Role of Parasite-Derived Extracellular Vesicles During Tropical Pulmonary Eosinophilia. Shweta Tiwari, Rahul Roy, Amit Kumar Shahravat, Shikha Yadav, Mrigank Srivastava
- Development of a Promising Oral Co-therapy for Experimental Visceral Leishmaniasis. Karthik Ramalingam, Yashi Singh, J V Pratap, Neena Goyal1,
- Effect of a Dihydrochalcone on Medial Artery Calcification in Rat. Sonalika Gupta, Sahitya Uppada, Manoj Kumar Barthwal
- Azatricycles via Enantioselective Post-Ugi Modifications. Mandweep Bhumij, Mayur D. Ambule, Sagar Sinha, Surbhi Prabhat, Ruchir Kant, Ajay Kumar Srivastava
- Quorum Quenching Using Recombinant Lactonases: An Answer to AMR. Pushplata Yadav, Jesu Arockiaraj, Mukesh Pasupuletic
- Asymmetric Synthesis of Nature-inspired Isoflavonoid Scaffolds and its Biological Activity. Shyamal Pal, Pallavi Awasthi, Divya Singh, Atul Goel
- Selective Staining of Lipid Droplets Using Donor-Acceptor Fluorescent Dyes. Aradhana Chauhan, Chandra P. Sharma, Akanksha Vyas, Monika Sachdev, Atul Goel
- Characterization of the Role of MSMEG_3119, an Rv1458c Ortholog, and a Putative ATP-Binding ABC Transporter Protein. Rajendra Kumar Dhuriya, Ruchi Verma, Garima Kumari, Mohd Mustkim Ansaria, Bhupendra N. Singh
- Copper-Catalyzed Decarboxylative Coupling and Dehydro-Diels-Alder (DDA) Reaction between Arylpropiolic Acids and Isocyanides. Monty Kumar, Prashant Kumar, Ruchir Kant, Ajay Kumar Srivastava
- The Role of Host miRNA, hsa-miR-643, in Host-Pathogen Interactions: A Potential Therapeutic Target for Tuberculosis. Garima Kumari, Rajendra Kumar Dhuriya, Gunjan, Ruchi Verma, Mohd Mustkim Ansari, Bhupendra N. Singh
- Studies on Glycolysis Regulation of Drug Resistance in Cancer Cells. Barkha Jangir, Neelam Gupta, Abinash Swain, Abhisek Sarkar, Durga Prasad Mishra
- Therapeutic Targeting of Fibrosis in Alcoholic Liver Disease. Abhisek Sarkar, Abhishek Nirwan, Barkha Jangir, Durga Prasad Mishra
- Experimental Investigation for the Potential Role of Indian North-East Specific Rice Starch for Mitigating Degradation of Moisture-Sensitive APIs. Prajyot R. Sononea, Manish Kumar Chourasia, and Pawan K. Porwal
- *Withania somnifera*: Its Role in Atherosclerosis Prevention and Foam Cell Reduction. Kunwar Satyadeep Srivastav, Alok Srivastava, Anagha Ranade, Sachin Kumar, Kumaravelu Jagavelu, Madhu Dikshit, Manoj Kumar Barthwal
- miR 149 PARP 2 Signaling Regulates E-Cadherin and N-Cadherin Expression in the Murine Model of Endometrium Receptivity. Raj Kumar Verma, Upendra Kumar Soni, Sangappa Basanna Chadchan, Vineet Kumar Maurya, Mohini Soni, Sudarsan Sarkar, J. Venkatesh Pratap, Rajesh Kumar Jha
- Synthesis of Isoxazole Derivatives via Photo-Oxygenation of Furan-Tethered α-Azidoketones. Uma Devi Newar, Ram Awatar Maurya

- Nurr1 Activation Provides Neuroprotection and Improves Behavioural Deficits in 6-OHDA Induced Parkinsonian Rats Through the Regulation of Mitochondrial Autophagy. Kumari Alka, Parul, Animesh Singh, Sachin Kumar, Himanshi Rawat, Shubha Shukla
- Integrating Machine Learning and Pharmacogenomics for Biomarker Discovery and Drug Prioritization in Ovarian Cancer. Aman Chandra Kaushik, Shivangee Yadav, Shubham Krushna Talware, Mohammad Imran Siddiqi
- Functional Analysis of MS0754 in *Mycobacterium smegmatis*: A Conserved Hypothetical Protein with a Role in Stress Response. Ruchi Verma, Rajendra Kumar Dhuriya, Garima Kumari, Bhupendra N. Singh
- Metformin-Mediated Enhanced Mitophagy Exerts Neuroprotection in Rats. Sachi Bharti, Sachin Kumar, Kanika Pasrija, Shubha Shukla
- CsF-Mediated Reaction of Trifluorodiazoethane with 3-Nitroindoles Enables Access to Trifluoromethylpyrazolo[4,3 b]indoles. Lubina Fatma, Sandeep Kumar, Kishor Mohanan
- Effect of Apelin on Angiotensin II-Induced Cardiac Hypertrophy. Ushneet Chhabra, Gagandeep Kaur, Ayushi Devendrasingh Chaudhary, Shashi Kumar Gupta, Manoj Kumar Barthwal
- LC-MS/MS Method Development and Validation: Application to Formulation Development and Pharmacokinetic Analysis of Doxorubicin and Baicalein. Pooja Yadav, Sanjay Singh, Divya Chauhan, Pavan Kumar Yadav, Manish Kumar Chourasia
- Role of Metabolic Reprogramming in Vascular Smooth Muscle Cell Calcification. Dinesh Kumar, Heena Agarwal, Manoj Kumar Barthwal
- Identification and Characterization of a Novel Protein-Protein Interaction among SARS-CoV-2 Nucleocapsid, host SFPQ and hnRNP U and its Potential Role in Virus Replication. Ashish Agrahari, Km. Archana, Nittu Singh, Akshay Joshi, BSV Vinod, Sourav Haldar, Krishan Gopal Thakur, Raj Kamal Tripathi
- Regenerative Medicine to Treat Male Infertility. Anju Negi, Rajnikant Mishra, Arti Kumari, Neerua, Monika Sachdev
- Visible Light Photoredox Aziridination of Chalcones. Oj Shikhar Srivastava, Varun Anand, Namrata Rastogi
- ILKAP Mediated Regulation of ILK Activation Signaling in the Endometriotic Cells during Endometriosis. Rupal Tripathi , Sudarsan Sarkar, Rajesh Kumar Jha
- Direct Use of Wittig Salts for Alkylation of p-Quinols via 5-Membered Betaine-Type Intermediate. Saddam Husen, Priyankar Jha, Akansha Singh, Ravindra Kumar
- Design and Synthesis of 2-Amino Pyrimidine Derivatives as Novel and Selective D5 Receptor Partial Agonists. Subrata Roy, Sakesh Kumar, Sumit K. Rastogi, Kajal Sharma, Santosh Kumar, Debalina Maity, Diwan Chand, Sachin Vishwakarma, Jiaur R. Gayen, Kinshuk R. Srivastava, Prem N. Yadav, Ravindra Kumar
- ERK5 Acts as One of the Regulatory Molecules During Endometrial Receptivity in the Mouse Model. Sudarsan Sarkar, Rajesh Kumar Jha
- Deletion of MSMEG_3118 in *Mycobacterium smegmatis* Alters Lipid Metabolism and Drug Susceptibility. Gunjan, Garima Kumari, Bhupendra N. Singh
- Therapeutic Potential of Phloretin in Preventing Peripheral Artery Disease. Sahitya Uppada, Sonalika Gupta, Manoj Kumar Barthwal
- Targeting M2 Polarization of Macrophages Through Selective Inhibition of mTORC2: Implications in Cancer Cell Invasion and Breast Cancer Metastasis. Usmani Mohammed Akif, Moinuddin, Narayan Kumar, Smrati Bhadauria
- Pseudo C-H Activation of *In Situ* Generated Aza-Oxyallyl Cations with CF3-Nitrones: A New Approach to Amide-containing trifluoromethylated 1,3-Amino Alcohols. Mumtaz Ahmad, Muhammad Fahad Jamali, Kishor Mohanan
- Construction of 3,6-Difluoropyridones via Double Defluorinative [3+3] Annulation of α-Fluoro-α-sulfonylacetamides with CF3-alkenes. Usha Yadav, Sanoop P. Chandrasekharan, Kishor Mohanan
- Iodine-mediated Oxidative Annulation of Quinoxalinones with Oxime Esters, an Approach Towards Imidazoquinoxalinones. Prashant Kumar, Ruchir Kant, Ajay Kumar Srivastava
- Synthesis and Bioevaluation of 1,2-disubstituted 2H-Imidazo [5,1-A]Isoquinolin-4-Ium Halides as Biased KOR Agonist and Antiplasmodial. Afreen J. Rahman, Samriddhi Upadhyay, Manish Dash, Ashan Manhas, Prem N. Yadav, Niti Kumar, Sanjay Batra
- Three-Component Synthesis of Cyanopyrazoles Employing Diazoacetonitrile. Rekha Singroha, Kishor Mohanan
- Role of *Withania somnifera* in Preventing Collagen-Induced Arthritis. Gagandeep Kaur, Ushneet Chhabra, Milirani Das, Sheeba Saji Samuel, Alok Srivastava, Anagha Ranade, Sachin Kumar, Madhu Dikshit, Manoj K. Barthwal
- Purification of Sperm-Specific Human PGK2 and Establishing the Biochemical Screening Assay for Identification of PGK2 Inhibitors. Samprikta Kundu, Safia Baig, Ariba Mahmood, Niti Kumar, Shashi K. Gupta
- N6A-methyladenosine Reader Protein Ythdf3 Regulates Cardiomyocyte Apoptosis by Modulating Alternative Splicing. Aakash Gaur, Sakshi Chaudhry, Rakesh Kumar Sharma, Ganesh E, Sandhya Singh, Shakti Prakash, Shailesh Kumar, Kalyan Mitra, Shashi Kumar Gupta

- Potential Role of CLUH RNA-Binding Protein in MAFLD Progression. Ayushi Devendrasingh Chaudhary, Aakash Gaur, Shashi K. Gupta
- Oral D-Galactose Induces Brain Aging and Senescence Markers in Swiss Mice: A Comparative Study with Intraperitoneal Administration. Sachin Kumar, Sachi Bharti, Kanika Pasrija, Shubha Shukla
- Targeting the Glycolytic Pathway in *Leishmania donovani* Parasites. Juhi Sharma, Swetapadma Majhi, Kalyan Mitra
- Bromocriptine Loaded TPP Sheathed Cerium Vandate Nanoparticles: Rescue Dopaminergic Neurons in 6-OHDA PD Model. Keerti Mishra, Manish K. Chourasia
- Identification and Functional Characterization of Novel Nav 1.7 Ion Channel Inhibitor Activity Against Neuropathic Pain. Shivani Pal, Madhavi Ranawat, Aravind Singh Kshatri
- An Exonuclease Conserved in Alveolates is Targeted to the *Plasmodium falciparum* Mitochondrion and has Potential Role in DNA Replication/Repair. Shivani Mishra, Saman Habib
- Validation of Microglial Hv1 Channel Functions Using Small Molecule Modulators. Ashutosh Sharma, Valmik Shinde, Aravind Singh Kshatri
- Development of an LC-MS/MS Method for Simultaneous Quantification of Raloxifene and Cladrin in Rat Plasma: Application to Pharmacokinetic Studies. Divya Chauhan, Shailesh Dadge, Pavan K Yadav, Nazneen Sultana, Manish K Chourasia, Jiaur R Gayen
- Chemical Investigation of *Mitragyna parvifolia* Leaves and its Efficacy in Therapeutic Targeting of NAFLD. Hariom, Abhinav Singh, Shilpa, Roli Verma, Ambalika Gond, Vineeta Tripathi, Jagavelu Kumaravelub, Richa Pandeya
- Unraveling the Role of XRCC1 in Cancer-Associated Cachexia. Abinash Swain, Neelam Gupta, Arun Kumar, Durga Prasad Mishra
- Therapeutic Targeting of Osteomimicry Mediated Breast Cancer Bone Metastasis. Arun Kumar, Ankita Behera, Durga Prasad Mishra
- Evaluation of AdipoR1 Selective Agonist for its Myogenic and Therapeutic Potential Against Skeletal Muscle Atrophy. Md Rameez Moin, Shubhrajyoti Das, Sabyasachi Sanyal
- Design and Synthesis of Biaryl Substituted Scaffold for the Discovery of Hits Against Antimicrobial Resistance. Aneeza Noor, Asif Ali
- Characterization of POTE-paralogs in the Pathogenesis of Cervical Cancer. N Kumar, R Sahu, A Vyas, S Agnihotri, D Singh, R K Mishra, A Kumari, MLB Bhatt, R Gupta, K Srivastava, M Verma, R Sachan, M. Sachdev

10th Indian Peptide Symposium, Pune, 26–28 February 2025

- Green Solid Phase Peptide Synthesis (G-SPPS): A Sustainable Approach. Ravi Tejsingh, Anamikasharma, Mukesh Pasupuleti

NMR-based Metabolomics and *In Vitro* Diagnostic Research, Lucknow, 24 February – 01 March 2025

- Development and Validation of HPLC-PDA Method for the Quantitative Analysis of Flavonoid C-glycosides in *Cajanus scarabaeoides* and *Rhynchosia minima*. Arvind Kumar Maurya, Ashish Singh Tanwar, Dipak K. Mishra, Sanjeev Kanojiya

Women in Academia, Research and Management for Empowering Successful Transformation (WARMEST), Lucknow, 06–08 March 2025

- Mitochondrial Dysregulation and Oxidative Stress in DON-Induced Neurotoxicity: Unravelling the Role of Fission Dynamics in Neuronal Cell Death. Sakshi Mishra, D. Sharma, G. Jha, B. Tomar, S. K. Rath
- *Litsea glutinosa* Extract Enhances Fracture Healing and Prevents Bone Loss through Activation of BMP2/SMAD1 Signaling. Ankita Paul, Divya Singh

Inaugural Conference of InSEV- EVOLVE 2025, AIIMS New Delhi, 24–26 March 2025

- A Multiplexed Markers Approach for the Diagnosis of Cervical Cancer. P Das, A Vyas, N Kumar, R Sahu, A Jain, S Agnihotri, M Ahmed, MLB.Bhatt, K Srivastava, R Gupta, M Verma, R Sachan, D Bandyopadhyay, M Sachdev

4 Invited Lectures Delivered by Institute Scientists

Dr. Radha Rangarajan

- "Perspectives on AI in Drug Discovery" in Webinar on Artificial Intelligence in Drug Discovery by DNDi, Online, 29 April 2024.
- "Building a Portfolio of Target Enabling Packages" in Non-hormonal Contraception Meeting of the Bill and Melinda Gates Foundation, Bayer's Science Campus Berlin, Germany, 06 May 2024.
- "Research-led Innovation: the Role of Publicly Funded Institutions" in 33rd CRSI-ACS Symposium Series in Chemistry, Leadership Academy, Dr. Reddy's Laboratories Ltd., Hyderabad, 05 July 2024.
- "Drug Discovery and Development in the Age of Medtech" in Indo-Singapore e-Workshop: Digital Health & Medical Technologies, Online, 17 July 2024.
- "Advances in Safety and Toxicity Testing for Drug Discovery" in Webinar for Society of Toxicologic Pathology-India, Online, 13 September 2024.
- "Experiences of Drug Discovery and Development from a Publicly Funded Institution: CDRI" in Presentation for Tres Cantos Open Lab Foundation, 08 October 2024.
- "Defining Goals: TPPs and more" in Workshop on Practical Aspects of Small Molecule Drug Discovery, Severo Ochoa 2, Tres Cantos (Madrid), Spain, 04 November 2024.
- "A Comprehensive Approach to Addressing Antimicrobial Resistance (AMR)", Keynote Address at the 8th Annual Conference of the Society for the Study of Xenobiotics, Birla Institute of Technology and Sciences, Pilani-Hyderabad campus, 24 January 2025.
- "Antibacterial Drug Discovery and Development: Novel Drugs and Other Modalities", Invited Lecture at the 18th Annual Conference of the Hospital Infection Society, SGPGIMS, Lucknow, 07 February 2025.
- "Diversified Therapeutic Approaches for Addressing Antimicrobial Resistance", Keynote Address at the International Conference on Pharmaceutical and Biomedical Sciences 2025, NIPER Ahmedabad, 21 March 2025.

Dr. Saman Habib

- "A Unique Evolutionary Event and Targets for Intervention Against Malaria" in Eminent Speaker Series, Department of Pharmacy, Lucknow University, Lucknow, 18 April 2024.
- "Organelle Biology and Targets for Intervention Against Malaria" in Workshop on Advanced Drug Designing and Computational Biology (under the SPARC scheme), Faculty of Sciences, Jamia Millia Islamia, New Delhi, 16 September 2024.
- "Pre-clinical Development of an Antimalarial Lead" in the 32nd National Conference on Parasitology, IISER-Pune, 05 October 2024.
- "Players in Replication and Repair of Malaria Parasite Organelle Genomes and Role of an LCR in Substrate Repertoire Expansion" in International Workshop on New Approaches to Discover Vaccines and Drugs for Infectious Diseases, ICGEB, New Delhi, 02-04 December 2024.
- Panelist and Mentor, Workshop on Women Leadership in Academia, IIT-Bombay, POWER-Bio and India Bioscience, 06-07 February 2025.
- Invited speaker in 1st Infectious Disease Symposium, National Institute of Biomedical Genomics (NIBMG), Kalyani, 24 February 2025.
- Invited speaker in the Faculty of Life Sciences, Central University of Hyderabad, 04 March 2025.
- "Low Complexity Regions and Unique Functionalities in Proteins of the Malaria Parasite", Speaker and Mentor, Regional Young Investigators' Meet, India Bioscience with Ashoka University and NBRC, Gurgaon, 19-21 March 2025.

Dr. Sanjay Batra

- "Biased -Opioid Receptor Agonists for Treating Chronic Pain" in Plenary Lecture in National Conference on Chemistry-Innovation and Translations in Drug Discovery (CITDD-2025), NIPER Ahmedabad, 28 February 2025.

Dr. Atul Goel

- "Fluorescent Dyes and Carbon Nanomaterial-based Sensors for Diagnostics and Biomedical Applications" in the Asian Assembly of Advanced Materials, Jodhpur, 24-26 September 2024.
- "Donor-Acceptor Fluorescent Probes for Diagnostics and Biomedical Applications" in International Conference on Multidisciplinary Approaches to Chemical Sciences (InCoMACS-2024), National PG College, Lucknow, 25 October 2024.
- "Functionalized Fluorescent Probes for Diagnostics and Biomedical Applications" in Current Trends in Chemical,

Biological and Pharmaceutical Sciences: Impact on Health and Environment, ISCB-2025, Lucknow University, Lucknow, 27-29 January 2025.

- "Multicolored Fluorescent Materials for Diagnostics and Biomedical Applications" in the 3rd International Conference on Energy, Functional Materials/Molecules and Nanotechnology (ICEFN-2025), Kumaun University, Nainital, 20-22 March 2025.

Dr. Bhupendra N Singh

- "Biosafety Measures in Research Labs: Biosafety Levels and Containment Practices" in One-Day Workshop on Laboratory Biosafety Training. Integral University, Lucknow, 07 December 2024.

Dr. S. K. Rath

- "Drug Discovery, Development & Challenges: A Story of a Difficult Path and Opportunities" in "Unlocking Molecular Biology: A Hands-On Experience for Beginners", Ravenshaw University, Cuttack, 22 August 2024.
- "Dr P.V. Mohanan Memorial Lecture: His achievements and Contributions" in the 43rd STOX Meeting & ICCTT2024 Conference at Lovely Professional University, Punjab, 17 October 2024.
- "GLP Documentation and Record-keeping, Study Plan, and Study Reports" in Refresher Training on OECD-GLP: Monitoring and Management, IITR, Lucknow, 11 November 2024.
- "Issues Relevant to Human Health Risk Assessment and Challenges" in International Toxicology Convention on Emerging Approaches in Risk Assessment and Translational Aspects of Health and Environment (EARTH)-2024, 28 November 2024.
- "Working in a Good Laboratory Practice (GLP) Environment: The Positive Outcomes" in International Symposium on Global Trends in Health, Technology and Management- 2025, Global Health Techno Management Forum (GHTMF), Global Institute of Pharmaceutical Education and Research, Kashipur (GIPER), Kashipur, Uttarakhand, 16 February 2025.
- "Regulatory Requirements and Healthcare in India" in Indian Society of Precision Medicine and Molecular Medicine Meeting, AIIMS, Gorakhpur, 01 March 2025.

Dr. Amit Misra

- "Host-pathogen Dialectics and 'Host-Directed Therapy' in Tuberculosis" at IISER-Bhopal, 01 April 2024.
- "Pragmatic Technology for Frugal Innovation by MSME in the Stringently Regulated Pharmaceuticals and Medical Biotechnology Sectors" at CSIR-IMMT, Bhubaneswar, 13 November 2024.
- "Dry Powder Inhalations" in the Faculty Development Programme on Novel Drug Delivery: Principles and Engineering (NDDPE-2024), Madan Mohan Malaviya University of Technology (MMMUT), Gorakhpur, 09-13 December 2024.
- "Host-Pathogen Dialectics and 'Host-Directed Therapy' in Tuberculosis" in Indian Association for the Cultivation of Science (IACS)-Kolkata, 05 February 2025.
- "Centinhale - A Dry Powder Inhalation Containing Isoniazid and Rifabutin for Adjunct Therapy of Pulmonary Tuberculosis" in India Innovation Summit, ICMR-DHR, New Delhi, 22 March 2025.

Dr. Gautam Panda

- "Chiron Amino Acids derived Privileged Scaffolds and Natural Products: Design, Synthesis and Bioevaluation towards Therapeutic Agents" at University of Hyderabad, Hyderabad, June 2024.
- "Synthetic Approaches Towards Privileged Scaffolds and Natural Products as Therapeutic Agents" at Utkal University, Bhubaneshwar, November 2024.

Dr. Sabyasachi Sanyal

- "Discovery of Small Molecule Adiponectin Receptor Agonists for first-in-class Therapy against Metabolic Diseases/Disorders" in National Conference on "Advances in Biological Sciences: Molecules to Organisms", Department of Zoology at Aligarh Muslim University (AMU), Aligarh, UP, 27-29 December 2024.

Dr. Prabhat R Mishra

- "Navigating Challenges and Embracing Opportunities in Precision Nano-Medicine" at Birla Institute of Technology (BIT) - Mesra, 06 May 2024.
- "Technology-Driven Navigation of Challenges and Embracing Opportunities through Precision Nano-Medicine" at the Center for Biomedical Research (CBMR)-Lucknow, 10 May 2024.
- "Unlocking Opportunities in Precision Nano-Medicine through Technological Innovation" at GLA University, Mathura, 05 October 2024.

- "Unlocking Opportunities in Nano-Therapeutics through Technological Innovation" in Controlled Release Society - Indian Chapter (CRSIC) International Symposium, Mumbai, 26 February 2025.

Dr. T. Narender

- "Natural Products in Health Care" in UGC-Faculty Development Program on Indian Knowledge System and UGC - Malaviya Mission Teacher Training Programme organized by Jai Narain Vyas University, Jodhpur, 04 July 2024.
- "Development of Phytopharmaceuticals from the Indian Medicinal Plants" in International Conference on Frontier Areas of Chemistry (ICFAC), Mahatma Gandhi Central University, Motihari, Bihar, 19 March 2025.

Dr. Manoj K Barthwal

- Chief Guest and Invited Speaker for the National Science Day Celebration at Delhi Pharmaceutical Sciences and Research University (DPSRU), New Delhi, 27 February 2025.
- Chief Guest and Invited Speaker, International Symposium cum Workshop, titled "Futuristic Bioinformatics Shaping Young Minds', Amity University, Lucknow Campus, Lucknow, 20-21 March 2025.
- "Targeting Cardio-Inflammatory Phenotype in Heart Failure" in Annual Meeting of the International Society for Heart Research (Indian Section), IIT Madras, Chennai, 21-23 March 2025.

Dr. Divya Singh

- "The Interweaving Relation between Bone and Immune System: Role of Cytokines" in the International Symposium on Bone Health, AIIMS, New Delhi, 09 November 2024.
- "Targeting microRNAs by Natural Products: A Novel Therapeutic Approach for Osteoporosis" in the Conference on Emerging Approaches in Risk Analysis and Translational Aspects of Health and Environment (EARTH), CSIR-IITR, Lucknow, 27-30 November 2024.

Dr. Ritu Trivedi

- "Women in Science, Technology and Innovations: As Role models in Transforming Challenges into Innovative Solutions" at Birbal Sahni Institute of Palaeosciences (BSIP), Lucknow, 04 October 2024.
- Chaired the Scientific Session - Developmental Biology in the 47th Edition of the All-India Cell Biology Conference & International Symposium (47th AICBC) on "Cell in Action", National Institute of Science Education and Research (NISER), Bhubaneswar, 16-18 December 2024.

Dr. Manish K. Chourasia

- "Navigating the Journey of Drug Discovery and Development: From Target Identification to Post-Marketing Surveillance" in International Conference on Drug Discovery, Delivery, and Diagnostics (ICD4), NIPER-Hyderabad, 10 August 2024.
- "Regulatory Challenges in Drug Discovery and Development" at Rungta Institute of Pharmaceutical Sciences, Bhilai, Chhattisgarh, 20 September 2024.
- Keynote speaker in the National Seminar on Interdisciplinary Pharmacy Education for Reforming the Pharmaceutical Sector, LNCT University, Bhopal, 28 September 2024.

Dr. Arun Kumar Trivedi

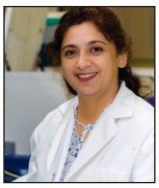
- "FBW7 Inhibits Myeloid Differentiation by Targeting PU.1 for Proteasome Degradation in a GSK3β-dependent Manner" in SERB-sponsored Faculty Development Workshop on "Current Advances in Cancer Immunology and Molecular Carcinogenesis", Motilal Nehru National Institute of Technology (MNNIT), Allahabad, 18-19 May 2024.

Dr. Aamir Nazir

- "Glia Enriched PTR-10, the *C. elegans* Homolog of Human PTCHD1, Plays a Crucial Role in Neuroprotection" in National Symposium on Cognitive Defects - Understanding the Mechanism for Better Therapeutic Management, Amity University, Lucknow, 25 September 2024.
- "Age-Related Neurodegeneration and Neuroprotection: Exploring the Role of PTR-10 and its Downstream Targets in *C. elegans*" in International Conference on the Advances in Mechanisms and Approaches to Neuro-Therapeutics (AIM-AT) & the XLII Annual Meeting of Indian Academy of Neurosciences (IAN), NIMHANS, Bengaluru, 12-14 November 2024.
- "PTR-10, the *C. elegans* Homolog of Human PTCHD1, Plays a Crucial Role in Neuroprotection" in EARTH-2024, International Toxicology Conference, CSIR-Indian Institute of Toxicology Research, Lucknow, 28 November 2024.

- "Studying Neurological Diseases in *C. elegans*: PTR-10, the Homolog of Human PTCHD1, Plays a Crucial Role in Neuroprotection" in 4th Asian Congress for Alternatives to Animal Experiments (4ACAAE) on Non-Animal Approaches: Concept, Validation and Regulatory Acceptance, New Delhi, 12-14 December 2024.

Dr. Smrati Bhadauria



- "Understanding and Targeting Breast Cancer Metastasis: Devising Experimental mTORC2 Inhibitory Modality Through Disruption of Vital Protein-Protein Interactions with SERB-DST, JK ST, and IC" in the 1st International Conference on Breast Cancer, University of Kashmir, Srinagar, Jammu and Kashmir, 22 October 2024.

Dr. Sarika Singh

- "Ubiquitin E3 ligase Pirh2 in Alzheimer's disease" in 30th ISCB International Conference on Current Trends in Chemical, Biological and Pharmaceutical Sciences: Impact on Health and Environment, Lucknow, 27-29 January 2025.

Dr. Asif Ali

- "Traditional Wisdom to Modern Medicine: Unveiling Nature's Arsenal Against Neurological Disorders" in the National Conference on "Modern and Traditional Approaches in Pharmaco-therapeutics in Neuroscience and Mental Health" (MATHANAM-2024), NIMHANS, Bengaluru, 04-06 October 2024.
- "Natural Products: Their History, Limitations, and Potential for Development as Novel Therapeutics" at the School of Pharmaceutical Sciences, Lovely Professional University, Punjab, 18 October 2024.
- "A Journey of Drug Discovery from Natural Hidden Treasures to Medicinal Masters: A Way to Unlock New Therapeutic Opportunities" in Current Advances in Drug Design & Translational Science (CADDTS-2025), Jamia Millia Islamia, New Delhi, 27 February 2025.

Dr. Satish Mishra

- "Plasmodium Actin-Like Proteins are Essential for DNA Segregation during Male Gametogenesis and Malaria Transmission" in the 32nd National Congress on Parasitology, IISER, Pune, 03 October 2024.
- "A New Malaria Vaccine Candidate Based on Replication-Competent Plasmodium Parasites" at ICGEB, New Delhi, 02 December 2024.

Dr. Prem N Yadav

- "Modulation of Opioid Signaling in CNS: Implications in psychiatric disorders" in Conference on "Basic Principles and Avenues in CNS Drug Discovery", NIPER Hazipur, 25 August 2024.
- "Chemokines as the Orchestrators of Brain Aging" in the 38th Annual Conference of the Society of Neurochemistry, Punjab University, Chandigarh, 27 September 2024.
- "Designing, Conducting & Analysis of Pharmacological Response of Drugs or Drug-Like Substances" at CSJM University, Kanpur, 25 November 2024.

Dr. Kishor Mohanan

- "Trifluoromethylated Building Blocks from Trifluorodiazoethane: Metal-Free and Metal-Catalyzed Routes" in 30th International Conference on Organometallic Chemistry (ICOMC 2024), Agra, 14-18 July 2024.
- "Harnessing Trifluorodiazoethane for the Synthesis of Trifluoromethylated Building Blocks" in 7th International Symposium on C-H Activation (ISCHA 2024), Indian Institute of Technology (IIT) Bombay, Mumbai, 06-09 December 2024.

Dr. Sanjeev Kanojiya

- "Phytoequivalence and Quality Control of Herbal Medicine" at Captain Srinivasa Murthy Central Ayurveda Research Institute, Chennai, CCRAS, Ministry of AYUSH, Government of India, 25-30 November 2024.

Dr. Mrigank Srivastava

- "Eosinophils: Sentinels or Saboteurs during Filarial Manifestation of Tropical Pulmonary Eosinophilia" in 9th International Conference on Current Trends in Drug Discovery Research, CSIR-CDRI, Lucknow, 19-22 February 2025.

Dr. Namrata Rastogi

- "Visible Light Photoredox Chemistry of Diazo Compounds" in CRS Symposium 2024-Rasayan 19, IISER-Kolkata, 29 July 2024.
- "Visible Light-mediated Reactions of Diazo Compounds" in International Conference on Advances in Organic

Chemistry, Goa, 28 January 2025.

- "Diazo Umpolung in Hypervalent Iodine Diazo Reagents" in 30th ISCB International Conference, Lucknow University, 29 January 2025.
- "Reactivity Pattern of Diazo Group in Hypervalent Iodine Diazo Reagents" in 24th NOST Organic Chemistry Conference, Agra, 03 March 2025.
- "Sustainable Organophotocatalytic Synthesis of Carbo/Heterocycles" in 1st International Conference on Synthetic Innovations in Drug Development-(SIDD)-2025, Indrashil University, Gujarat, 24 March 2025.
- "Exploring Diazo Umpolung in Hypervalent Iodine Diazo Reagents" in ACS Meeting-Global Virtual Symposia, 25 March 2025.

Dr. Rajesh K. Jha

- "My research at Rajiv Gandhi Center for Biotechnology, Trivandrum, Kerala" in National Symposium on Biotechnology for Sustainable Development, RGCB, Trivandrum, Kerala, 20 April 2024.
- "Endometriotic Lesions' Growth and Inflammation in Preclinical Settings" in National Conference on Trends in Epigenetics in Cancer Diagnosis & Therapy, KL Deemed University, Guntur, AP, 28 August 2024.
- "Calcium-Dependent Cysteine Proteases-Mediated Intraovarian Proteases Signaling during PCOS Pathophysiology" in International Conference on Reproductive Sciences and Molecular Medicine: Innovations in Therapeutics and Technologies" (ICRSMM-2024) and 41st Annual Meet of Society for Reproductive Biology and Comparative Endocrinology (SRBCE) at University of Delhi (North Campus), Delhi, 17 November 2024.

Dr. Monika Sachdev

- "Germ Cell Maturation Markers Can Serve as Early Diagnostic Markers in Cancers and Targets for Immunotherapy" in International Conference on Advancements in Diagnostic Technologies: Global Healthcare Monitoring – 2024 (ADT-2024), Department of Biotechnology, Motilal Nehru National Institute of Technology (MNNIT), Allahabad, Prayagraj, 16 November 2024.
- "Expression of Germ Cell Maturation Markers in Cancerous Cells can be Explored for Early Diagnostics and Therapeutics" in Pan-IIT Meeting and Conference on Engineering in Medicine, Jointly Organised by the Department of Biological Sciences and Bioengineering, IIT Kanpur, and the Bhupat and Jyoti Mehta Family Foundation, Kanpur, 07 December 2024.
- "Chebulinic Acid Enriched Fraction (CAEF) for the Management of Benign Prostatic Hyperplasia (BPH)" in International Conference on Reproductive Biomedicine: Integrating Basic Biological and Applied Research into Clinical Practice for Human Welfare along with 35th Annual Meeting of the Indian Society for the Study of Reproduction and Fertility (ISSRF-2025), organized by Dr. B. Lal Institute of Biotechnology (BIBT), Jaipur, 16 February 2025.
- "Restoration of Dysfunctional Gonads through Stem Cells Therapy" in Women in Academia, Research and Management for Empowering Successful Transformations (WARMEST), CSIR-Indian Institute of Toxicology Research, Lucknow, 07 March 2025.

Dr. Madhav Nilakanth Mugale

- "Role of Histological Tools (H and E; Special Staining, Immunohistochemistry) in Interpreting Preclinical and Clinical Findings in Lead Molecule Development" at NIPER Raibareily, Lucknow, 26 August 2024.
- "Pre-Clinical Development of Medicinal and Aromatic Plant-based Leads" at CSIR-CIMAP, Lucknow, 26 September 2024.
- "New Chemical Entity (NCE): Regulatory Toxicology Testing and Safety in Drug Discovery: Updated Advances in the Current Scenario" in ISVPTCON-2024, 24th Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology (ISVPT), Department of Veterinary Pharmacology and Toxicology, College of Veterniary Science and Animal Husbandry, Pt. Deen Dayal Upadhyay Pashu Chikitsa Vigyan Viswavidyalaya Evam Go-Anusandhan Sansthan, Mathura, Uttar Pradesh, 21 November 2024.

Dr. Pintu Kumar Mandal

- "Organocatalytic Stereoselective Glycosylation: Access to 2-Deoxyglycosides" in International Conference on Recent Advances on Glycoscience and Glycotechnology (CARBO-XXXVIII), Gauhati University, Guwahati, Assam, 04-06 December 2024.

Dr. Nilanjana Majumdar

- "Unactivated Carboxylic Acids in Catalytic Asymmetric Ring-Opening Reactions" in Thieme Chemistry, 29 May 2024.

- "Unactivated Carboxylic Acids in Catalytic Asymmetric Ring-Opening Reactions" in Organic Chemistry Symposium (OCS 2024), IIT Kanpur, Kanpur, 08-09 September 2024.
- "Unactivated Carboxylic Acids in Catalytic Asymmetric Ring-Opening Reactions" in 2nd International Conference on "Emerging Areas of Chemistry" (ICEAC 2025), Department of Chemistry, Tripura University, Tripura, 12-14 February 2025.
- "Unactivated Carboxylic Acids in Catalytic Asymmetric Ring-Opening Reactions" in ACS Meetings Global Virtual Symposia Spring 2025 on Organic Synthesis in the Era of 'Sustainability', 23–27 March 2025.

Dr. Ajay Kumar Srivastava

- "Novel Molecular Frameworks and Sustainable Routes for Better Drugs" at NIPER, Raebareli, 26 September 2024.
- "S-017-0622: Journey towards An Oral PCSK9 Inhibitor" at IISER, Bhopal, 06 December 2024.

Dr. Chetan D Meshram

- "Reverse Genetics for Candidate Vaccine Development" in ICMR-IVI Roundtable Meeting on "Advancing Pandemic Preparedness with Plug-and-play Vaccine Platforms (PPPs) in India" (organized by ICMR in collaboration with IVI, Seoul), ICMR Headquarters, New Delhi, 28 October 2024.

Dr. Mukesh Pasupuleti

- "Peptides: scientific evolution" at Department of Pharmaceutical Biotechnology, Manipal Academy of Higher Education (MAHE), Manipal, 01 April 2024.
- "Taming the Innate Immune System to Treat the Emerging and Reemerging Pathogenic Infections" at the Institute of Bioresources and Sustainable Development (IBSD), Takyelpat, Imphal, Manipur, 05 April 2024.

Dr. Damodara Reddy N

- "Site-selective Editing and C-H Functionalization of Peptides for Therapeutic Applications" at Indian Institute of Science Education and Research (IISER), Pune, 26 February 2025.

Dr. Sashi Kumar Gupta

- Invited talk at Recent Advances in Disease Biology and Emerging Therapeutics" organized at the Department of Zoology, Institute of Science, Banaras Hindu University, Varanasi, 17-19 January 2025.

Dr. Sonia Verma

- "Unravelling the Impact of Marine Bacterium on Neurodegeneration in *Caenorhabditis elegans*" in National Conference on Women in Biotechnology Contribution in Accelerating Research and Entrepreneurship, Amity University, Lucknow, 23 October 2024.

Dr. Ashish Awasthi

- "Survival Analysis: Kaplan & Cox" in the Training Program of Hypothesis Testing, Study Design and Sample Size Estimation, SGPGIMS, Lucknow, 21 March 2025.

Dr. Rahul Shukla

- "Dengue: Vaccines or Therapeutics?" at Sir Ganga Ram Hospital, Delhi NCR, India, 05 August 2024.

Dr. Sourav Haldar

- "New Insights into Influenza Virus Biology: From Single Particle Fusion to Novel Antiviral Strategies" at 6th Biomembranes Symposium 2024, Indian Institute of Science, Bangalore, 11-13 July 2024.
- "New Insights into Influenza Virus Biology: From Single Particle Fusion to Novel Antiviral Strategies" at Saha Institute of Nuclear Physics, Kolkata, 06 November 2024.

5 Networks & Inter Agency Linkages

Projects Completed / Ongoing / Initiated during 2024-25

5.1 CSIR Mission / Thematic / In-house Projects

Title of the Project	PI	Project Start Date	Completion Date
CSIR Mission Mode Projects (MMP)			
Antiviral Mission: Discovery & Pre-clinical development of antivirals for COVID-19 & other diseases	Dr. Ravishankar R	08-11-2021	31-03-2025
API Mission: Active pharmaceutical ingredients for affordable health care	Dr. Gautam Panda	03-07-2023	31-03-2025
CSIR phytopharmaceutical mission (Phase-III)	Dr. Shubha Shukla	01-04-2024	31-03-2027
AMR Mission: A comprehensive approach to address antimicrobial resistance	Dr. Arunava Das Gupta	01-08-2024	31-03-2027
Millet Mission: Development of millet beverages/curd with probiotics for healthy ageing, indoleamine for anti-anxiety/stress and spice nutraceuticals, flavours with enhanced protein and micronutrient bioavailability	Dr. Prem Prakash Yadav	10-07-2023	31-03-2025
CSIR Head Quarter Controlled Projects (HCP)			
PAN CSIR Cancer Research Program: Making Cancer Care Affordable Empowering Women's Health: Focusing on breast and gynecological cancers of Indian relevance	Dr. Dipak Datta	29-06-2021	31-03-2026
Translational neuroscience: Pharmacological validation of key biological pathways involved in the neurodegenerative diseases	Dr. Prem N. Yadav	01-04-2024	31-03-2026
Phenome India-CSIR health cohort knowledge base	Dr. Amit Lahiri	03-08-2022	02-08-2027
CSIR Jigyasa 2.0 programme with the concept virtual laboratory integration project (CJVL)	Dr. Sanjeev Yadav	17-08-2022	31-03-2026
Fast Track Translation Projects (FTT)			
Multiplex platform technology for clinical diagnosis of pathogens for monsoon fever panel	Dr. Ashish Arora	10-04-2024	31-03-2026
Subsequent new drug application (SNDA) enabling studies for sustained for released corneal targeted antifungal formulation	Dr. Rabi Shankar Bhatta	14-10-2022	30-09-2024
Fundamental Basic Research Projects (FBR)			
Development of imine reductase-based biocatalytic platform for the synthesis of chiral amines building blocks for drug discovery and development applications	Dr. Kinshuk Raj Srivastava	26-04-2024	31-03-2026
Unravelling the crosstalk between gut dysbiosis and neutrophil heterogeneity in Ulcerative Colitis	Dr. Amit Lahiri	20-05-2024	31-03-2026
Niche Creating High Science Projects (NCP)			
Modern innovative solutions for environmental/occupational lung health challenges using clinical and pre-clinical strategies	Dr. Kashif Hanif	15-07-2020	31-03-2025
Chemical biology approaches towards dissecting non-canonical protein functions and novel targets in the Malaria, Leishmania, and Filaria parasites	Dr. Saman Habib	05-08-2020	31-03-2025
Discovery of selective KOR ligands for the treatment-resistant depression and neuropathic pain	Dr. Prem Prakash Yadav	05-08-2020	31-03-2025
Multipronged studies on persistence and drug resistance in mycobacteria	Dr. B.N. Singh	05-08-2020	31-03-2025
Novel and integrative approaches towards discovery of small molecule therapeutics for healthy ageing (NISTHA)	Dr. Prem Narayan Yadav	05-08-2020	31-03-2025
Understanding the mechanism of osteopenia and aberrant bone formation, and discovery of new targets for skeletal medicine (Osteo Target)	Dr. Naibedya Chattopadhyay	05-08-2020	31-03-2025

Network Projects			
CSIR Integrated Skill Initiative- Phase-II	Dr. Anil N Gaikwad	16-10-2020	31-03-2025
R&D Seed Fund Projects (RDSF)			
Discovery of sclerostin-LRP5/6-Targeting Molecules for chronic kidney disease-induced osteoporosis therapy	Dr. Kinshuk Raj Srivastava	01-04-2024	31-03-2026
Study of alternative immune checkpoint ligands in treatment-resistant breast cancers	Dr. Dibyendu Banerjee	01-04-2024	31-03-2026
CSIR-Young Scientist Award Scheme			
Studies on the functional characterization of RNA editing ligase 1 (REL1) of Leishmania donovani as drug target	Dr. Bidyut Purkait	02-08-2021	01-08-2026

5.2 In-house (Funded by CSIR-CDRI)

Title of the Project	PI	Project Start Date	Completion Date
Identification of natural product inhibitors of TRPA1 channels to combat chronic pain	Dr. Aravind Singh Kshatri	06-07-2023	31-03-2025
Identification and characterization of skeletal muscle anabolic and anti-muscular atrophy hits and leads with GLP-1R or AdipoR agonist activities	Dr. Sabyasachi Sanyal	06-07-2023	31-03-2025
Small molecule and peptide inhibitors of sclerostin signaling: A promising therapy for CKD-induced osteoporosis	Dr. Divya Singh	06-07-2023	31-03-2025
White to brown adipocyte trans-differentiation: Hit to lead optimization for novel specific beta 3 adrenergic agonists	Dr. Anil Nilkanth Gaikwad	06-07-2023	31-03-2025
Non-invasive early detection of cervical cancer through immuno-sensing of cancer-biomarker and HPV from sera & urine samples	Dr. Monika Sachdev	06-07-2023	31-03-2025
Therapeutic targeting of Plasmodium autophagy; mechanistic studies and optimization of identified hits	Dr. Satish Mishra	06-07-2023	31-03-2025
Exploring non-canonical secondary structures (G-quadruplexes) as alternative targets for malaria intervention	Dr. Namrata Rastogi	06-07-2023	31-03-2025
Targeting *de novo* pyrimidine biosynthesis enzyme SHMT for the discovery of novel antimalarials	Dr. Prem Prakash Yadav	06-07-2023	31-03-2025
Optimization of Malaria Libre hit MMV023227 for the discovery of new antimalarials	Dr. Prem Prakash Yadav	06-07-2023	31-03-2025
Design and testing of bacterial peptidyl-tRNA hydrolase inhibitors as broad-spectrum antimicrobial agents	Dr. Ashish Arora	06-07-2023	31-03-2025
Generation of well-defined microbial repository to support drug discovery programs at CDRI	Dr. Mukesh Pasupuleti	06-07-2023	31-03-2025
Multi-pronged approach to identify NDM-1 inhibitors	Dr. Sidharth Chopra	06-07-2023	31-03-2025
Mucosal drug delivery systems for bacterial vaginosis and vulvovaginal candidiasis	Dr. Amit Misra	06-07-2023	31-03-2025
Investigation on the therapeutic potential of short novel designer antimicrobial peptides	Dr. Jimut Kanti Ghosh	06-07-2023	31-03-2025
In vitro screening of small molecule(s) against all four dengue virus serotypes (DENV-1,-2, -3 and -4)	Dr. Rahul Shukla	21-07-2023	31-03-2025
Preclinical pharmaceutics and pharmacokinetic studies of CDRI candidate drugs, formulations and phytopharmaceuticals	Dr. P. R. Mishra	26-07-2023	31-03-2025
Targeting the loop region of flavivirus RDRP: A structure-based drug development approach	Dr. Raj Kamal Tripathi	08-09-2023	31-03-2025
Quest for inhibitors against Mtb KasA and DprE1	Dr. Gautam Panda	08-09-2023	31-03-2025
Design and development of pyrazoloindole derivatives as novel potential drug candidates for treatment of dengue infections	Dr. Rahul Shukla	08-09-2023	31-03-2025
Discovery of hits and leads against musculoskeletal disorders	Dr. Divya singh	08-09-2023	31-03-2025

Development for assay and screening method for ClpP activators	Dr. Kumaravelu J.	08-09-2023	31-03-2025
Discovery of hits and leads against parasitic diseases	Dr. Satish Mishra	08-09-2023	31-03-2025
Validation of TNB-specific gene panel for prediction of metastasis and recurrence	Dr. Dibyendu Banerjee	24-11-2023	31-03-2025
Preclinical development and scientific validation of *Putranjiva* seeds for female pro-fertility	Dr. Monika Sachdev	24-11-2023	31-03-2025
Exploration of PCSK9 as a molecular target for the PCOS management strategies	Dr. Rajesh Jha	24-11-2023	31-03-2025
Screening of novel natural products as Nav1.7 channel inhibitors for the treatment of pain	Dr. Aravind Singh Kshatri	11-12-2023	31-03-2025
Determination of hERG liability of test compounds using manual patch clamp assay	Dr. Aravind Singh Kshatri	05-04-2024	31-03-2025
Safety and risk assessment	Dr. SK Rath	05-04-2024	31-03-2025
Design of daptomycin and colistin type naturally inspired antibiotic to target multidrug-resistant pathogens	Dr. Damodara Reddy N	05-04-2024	31-03-2025
Development of neutralizing monoclonal antibodies as therapeutics against dengue virus infection	Dr. Rahul Shukla	05-04-2024	31-03-2025
Clinical pharmacology and pharmacokinetics facility at CSIR CDRI (CRDTH Facility)	Dr. Amit Misra	01-04-2020	31-03-2025

5.3 Grant in Aid Projects

Title of the Project	PI	Project Start Date	Completion Date
Core Research Grant (CRG), Science and Engineering Research Board (SERB)/ Anusandhan National Research Foundation (ANRF)			
Organo-photoredox catalysis for visible light-driven synthesis of natural/ synthetic medicinal molecules	Dr. Namrata Rastogi	03-12-2020	02-04-2024
Investigation on the role of a novel, secreted small deoxyribonuclease of *Mycobacterium tuberculosis* in pathogenesis and immune modulation	Dr. Manju Y Krishnan	03-04-2021	02-07-2024
Metal-free direct olefination employing hypervalent Iodine reagents for rapid access to fluorinated building blocks	Dr. Kishor Mohanan	20-12-2021	19-03-2025
Molecular editing and site-selective C–H functionalization of antimicrobial peptides	Dr. Damodara Reddy N	17-12-2021	16-12-2024
The identification of atypical RNA polymerase II CTD phosphatases and their role in mRNA transcription	Dr. Md. Sohail Akhtar	31-12-2021	30-12-2024
Targeting nucleolin for refining anti-neoplastic chemo-immunotherapy and immunomodulation in B-cell lymphoma	Dr. Neeraj Jain	28-01-2022	27-07-2025
Elucidation of the structures, role in survival, and targets of the PadR family transcriptional factors of *Mycobacterium tuberculosis* H37Rv	Dr. Ashish Arora	10-02-2022	09-02-2025
Design and synthesis of biased Kappa opioid receptor agonists for treating chronic pain	Dr. Sanjay Batra	19-03-2022	18-09-2025
Merging electrochemistry and metal catalysis: Development towards sustainable and scalable catalytic processes	Dr. ValmikShankar Shinde	26-12-2022	25-12-2025
Development of asymmetric Isocyanide-based multi-component reactions (AIMCR) towards alkaloid-mimicking scaffolds and drugs	Dr. Ajay Kumar Srivastava	27-12-2022	26-12-2025
Leveraging vinyl azides and *in situ* generated Iminium intermediates for the synthesis of cyclic/acyclic amines under redox-neutral conditions	Dr. Nayan Ghosh	02-01-2023	01-01-2026
Development of organocatalytic photochemical reactions and their enantioselective variants	Dr. Chandra Bhushan Tripathi	09-01-2023	08-01-2026
Investigations on the diverse mechanisms involved in the distinct types of neutrophil death and their clearance in impacting immune tolerance or inflammatory outcome	Dr. Sachin Kumar	11-07-2023	10-07-2026

Deciphering the role of protein neddylation in malaria parasite and its targeting to block transmission	Dr. Satish Mishra	11-07-2023	10-07-2026
Rational design, development, and anti-microbial activity evaluation of a new class of inhibitors of bacterial peptidyl-tRNA hydrolase for tackling AMR	Dr. Ashish Arora	11-07-2023	10-07-2026
Immunomodulatory properties of cryptic host defense peptides against brain residing microglia cells and their potential implications in neurodegenerative diseases	Dr. Mukesh Pasupuleti	29-09-2023	28-09-2026
Exploration of cyclic diaryliodonium salts as biarylating agents to generate medicinally relevant biaryl scaffolds	Dr. Malleswara Rao Kuram	30-01-2024	29-01-2027
Stereoselective synthesis of structurally diverse Sp3-rich polycyclic scaffolds: Generation of high valued New Molecular Entities (NMEs) for GPCR modulators	Dr. Ravindra Kumar	23-02-2024	22-02-2027
Investigating the effect of adiponectin receptor 2 (AdipoR2) agonism on non-alcoholic fatty liver disease (NAFLD); a POC study for assessing the potential for AdipoR2 as a novel therapeutic target	Dr. Sabyasachi Sanyal	04-03-2024	03-03-2027
Transition metal-catalyzed fluorine insertion in small organic molecules	Dr. Nilanjana Majumdar	15-03-2024	14-03-2027
Understanding the role of PIM kinases in regulating sclerostin expression, secretion, and function: Hunt for an alternate target for the treatment of osteoporosis	Dr. Arun Kumar Trivedi	21-05-2024	20-05-2027
Unraveling the cardiac function of m6A RNA methylation reader protein YTHDF3	Dr. Shashi Kumar Gupta	31-05-2024	30-05-2027
Functional characterization of inflammatory bowel disease GWAS implicated protein C1orf53	Dr. Amit Lahiri	01-06-2024	31-05-2027
Studies on glial cells and associated transcription factors of helix-loop-helix family in context of neuroinflammation and neuronal repair employing *C. elegans* model	Dr. Aamir Nazir	01-06-2024	31-05-2027
To investigate the relevance of tumor necrosis factor-like weak inducer of apoptosis (TWEAK) as a novel therapeutic target and clinical severity marker in Chronic Obstructive Pulmonary Disorder (COPD) and associated pulmonary hypertension	Dr. Baisakhi Moharana	05-06-2024	04-06-2027
Novel β 3-adrenergic agonists as senolytics and insulin sensitizers: Studies in adipose tissue of metabolic dyshomeostasis model systems	Dr. Anil Nilkanth Gaikwad	13-06-2024	12-06-2027
Identification of opioidergic alkaloids from Alstonia scholaris in search of potent analgesic agents	Dr. Prem Narayan Yadav	05-10-2024	04-10-2027
Design and implementation of enzyme-like small scaffold as a bifunctional catalyst for stereoselective glycosylation	Dr. Pintu Kumar Mandal	02-01-2023	01-01-2026
Science and Technology Award for Research (STAR), SERB/ANRF			
Innate lymphoid cells and eosinophils: Exploring the mystery between a "player" and an "effector cell" during the pathogenesis of filarial manifestation of tropical pulmonary eosinophilia	Dr. Mrigank Srivastava	27-12-2021	26-03-2025
SERB Power Fellowship (SPF), SERB/ANRF			
Role of mitochondrial sirtuins 4/5 in aging-induced bone loss conditions	Dr. Divya Singh	27-12-2022	26-12-2025
Shining (Visible) light on the chemistry of diazo compounds	Dr. Namrata Rastogi	15-06-2024	14-06-2027
Swarna Jayanti Fellowship, SERB/ANRF			
Understanding the role of dynamin-related proteins (DRPs) in mitochondrial remodeling and inter-organelle communication in human malaria parasite	Dr. Niti Kumar	09-02-2022	08-02-2027
JC Bose National Fellowship, SERB/ANRF			
Unique proteins and pathways in organelles of the malaria parasite: Genome maintenance, transporters and mitophagy	Dr. Saman Habib	09-11-2021	08-11-2026
JC Bose fellowship renewal -assess the metabolic profile of NETotic PMNs so as to identify metabolites associated with NETosis	Dr. Madhu Dikshit	01-03-2021	20-11-2025
Intensification of Research in High Priority Areas (IRHPA), SERB/ANRF			
Establishing the North India Facility for Cryogenic-Electron Microscopy (cryo-EM) at IIT Kanpur	Dr. R. Ravishankar	18-12-2020	17-12-2025

Start-up Research Grant (SRG), SERB/ANRF			
Development of high throughput assay systems for screening of antiviral compounds against Dengue and Japanese Encephalitis viruses	Dr. Rahul Shukla	01-11-2022	31-10-2024
Development of *in vitro* and *in vivo* drug screening platforms against the chikungunya virus	Dr. Chetan Dewaji Meshram	23-01-2024	22-01-2026
Identification and functional characterization of novel Hv1 channel inhibitors for neuroprotection	Dr. Aravind Singh Kshatri	17-02-2024	16-02-2026
SERB Power Grant (SPG), SERB			
Decoding the role of Pirh2 in dementia of Alzheimer's type (DAT) related neurodegenerative signaling mechanisms	Dr. Sarika Singh	17-08-2022	16-08-2025
Role of nuclear mTOR: An autonomous modulator of gene expression	Dr. Smrati Bhadauria	16-08-2022	15-08-2025
Characterization of key enzymes involved in wedelolactone biosynthesis from *Eclipta prostrata* L. to enhance secondary metabolite contents	Dr. Vineeta Triapthi	10-10-2022	09-10-2025
Transition metal-catalyzed enantioselective C-X bond formation	Dr. Nilanjana Majumdar	21-08-2023	20-08-2026
Empowerment and Equity Opportunities for Excellence in Science (EEQ), SERB/ANRF			
Elucidating the mechanism of Sir2 (deacetylase enzyme) mediated epigenetic regulation of G6PDH and DNA repair property in manipulating AmB induced oxidative stress and apoptosis in AmB unresponsive clinical isolates of *Leishmania donovani*	Dr. Bidyut Purkait	14-03-2022	13-09-2025
Development of novel dual luciferase reporter-based high throughput assay for discovery of autophagy modulators and their functional characterization in mammalian system	Dr. Jayanta Sarkar	24-01-2023	23-01-2026
Teachers Associate for Research Excellence (TARE), SERB/ANRF			
Exploring the role of metabolic gene variants in myositis	Dr. Somali Sanyal	22-03-2023	21-03-2026
To study the role of phytoestrogen in modulating gut permeability and bone health: The gut-bones axis	Dr. Sapna Sharma	29-01-2027	28-01-2027
Synthesis and *in vitro* assessment of broad-spectrum antiviral activities of nucleoside analogues	Dr. Maneesh Kumar Gupta	08-02-2024	07-02-2027
Department of Science & Technology (DST), India			
Establishment of Nodal Center for Key Staring Materials and Intermediates under Therapeutics Chemicals Program	Dr. Koneni V. Sashidhara	30-06-2023	29-06-2024
Cost-effective route of nitisinone for alkaptonuria and hereditary tyrosinemia-1 (HT-1)	Dr. Gautam Panda	27-03-2023	26-03-2026
Sophisticated Analytical Instrument Facility (SAIF)	Dr. K V Sashidhara	01-04-2010	31-03-2026
INSPIRE Fellowship, DST, India			
Microfluidic devices for high throughput single neuron gene therapy: Parkinson's disease as the model	Dr. Pallavi Gupta	26-12-2022	25-12-2027
Women Scientist, DST, India			
Role of malnutrition in neurotoxic potential of deoxynivalenol, a mycotoxin	Dr. Sakshi Mishra	13-04-2022	12-04-2025
Receptor-targeted plasmonic gold nanobubble: Diagnostic probe for the elimination of post-operative residual microtumor (MRD)	Dr. Lipika Ray	23-05-2023	22-05-2026
Department of Biotechnology (DBT), India			
Development of small molecular antivirus against Chikungunya and Japanese encephalitis virus	Dr. Sanjay Batra	28-02-2020	27-02-2025
SELECTAR: Selection for antimicrobial resistance by antimicrobial production waste	Dr. Sidharth Chopra	16-12-2020	15-12-2024
A study on the intergenerational effect of maternal vitamin D3 deficiency on cognition and hippocampal neurons in rats	Dr. Naibedya Chattopadhyay	13-08-2021	12-02-2025
Exploring DNA transactions and genome maintenance in the malaria parasite	Dr. Saman Habib	24-09-2021	23-03-2025
Bioprospecting of marine microbial diversity for various products	Dr. T Narender	28-09-2021	27-03-2025
Establishment of bioinformatics and computational biology centre at CSIR-CDRI: Innovation in drug discovery research using bioinformatics and	Dr. Mohammad Imran Siddiqi	14-10-2021	13-10-2026

computational biology-BIC at CSIR, Central Drug Research Institute, Lucknow			
Apelin-ACE2 axis fate in hypertension and macrophage syndrome as complications in COVID-19: Focus on gender, age and comorbidities	Dr. Manoj Kumar Barthwal	16-02-2022	15-02-2026
Elucidating the role of nucleotide-binding oligomerization domain-containing proteins (NODs) in the development and progression of non-alcoholic fatty liver disease (NAFLD)	Dr. Akhilesh Kumar Tamrakar	21-03-2022	20-03-2026
Understanding the role of Wat1/mLst8, a TOR complex protein in the regulation of mitochondrial integrity and calcium ion homeostasis	Dr. Shakil Ahmed	17-03-2023	16-03-2026
In vivo validation and dose optimisation of the standardised fraction of *Desmodium gangeticum* for chronic kidney disease-induced osteoporosis	Dr. Naibedya Chattopadhyay	06-09-2023	05-09-2025
National network project of CSIR-Central Drug Research Institute, Lucknow Siddiqi	Dr. Mohammad Imran	20-10-2023	19-10-2028
Preclinical development of a natural molecule (N-012-0006) from *Crotalaria juncea* for the management of diabetic nephropathy	Dr. Akhilesh Kumar Tamrakar	02-05-2024	01-05-2027
Preclinical development and scientific validation of *Putranjiva* Seeds for female pro-fertility	Dr. Monika Sachdev	13-06-2024	12-06-2027
Unraveling the novel interplay of ubiquitination in the regulation of gene expression	Dr. Md. Sohail Akhtar	25-10-2024	24-10-2027
Unraveling the crosstalk between mitochondrial dynamics and gut dysbiosis in the pathogenesis of inflammatory bowel disease	Dr. Amit Lahiri	11-11-2024	10-11-2027
Ramalingaswami Fellowship, DBT, India			
Discovery of novel cell-autonomous host pathways and the contracting immune evasion strategies employed by vacuolar pathogens-an approach to identify new antimicrobial host-factors and novel microbial targets	Dr. Arun Kumar Haldar	09-08-2017	08-08-2024
Unravelling the role of Musashi2 (Msi2) in cardiac pathophysiology	Dr. Shashi Kumar Gupta	15-05-2020	14-05-2025
Delineate molecular mechanism in development of chemo-resistance in non-Hodgkin's lymphoma	Dr. Neeraj Jain	01-04-2021	06-08-2025
Development of novel antiviral nanoparticles against enveloped viruses utilizing host cell plasma membrane-derived vesicles	Dr. Sourav Haldar	31-01-2022	30-01-2027
Biocatalytic combinatorial synthesis of cyclic dipeptides for diverse biological applications	Dr. Kinshuk Raj Srivastava	16-08-2019	15-02-2025
Tata Innovation Award, DBT, India			
Development of innovative combinations of umifenovir and molnupiravir for enhanced antiviral efficacy with a focus on Japanese encephalitis and SARS-Cov2	Dr. R. Ravishankar	25-09-2023	24-09-2026
BioCare-DBT			
Identifying kinases regulating Glucocorticoid receptor (GR) protein stability: its implication in combatting glucocorticoid (GC)-induced paclitaxel resistance in Triple Negative Breast Cancers (TNBCs)	Dr. Swati Srivastava	15-01-2024	14-01-2027
Welcome DBT India Alliance, DBT, India			
Pre-grants Research management	Dr. Bhawana George	01-10-2021	30-05-2024
Investigating the role of peroxisome-mediated immune response during the pathogenesis of inflammatory bowel disease	Dr. Veena Ammanathan	01-03-2023	28-02-2028
Indian Council of Medical Research, India			
Centre for Product Development	Dr. Vivek Vidyadhar Bhosale	11-12-2019	15-12-2024
Design and development of injectable and biodegradable *in situ* depot forming lyotropic liquid crystal system for controlled intratumoral drug delivery	Dr. Manish Kumar Chourasia	28-01-2021	27-07-2024
Phase 1 academic clinical trial of safety, pharmacokinetics and early measurement of drug activity of CENTINHALE dry powder inhalation	Dr. Amit Misra	16-01-2023	15-07-2024
A Phase III, multicentre, randomized, double-blind, placebo-controlled interventional study on efficacy and safety of standardized fraction of	Dr. Vivek Vidyadhar Bhosale	02-02-2023	01-02-2025

Picrorhiza kurroa Royal Ex Benth (Picroliv) for 24 weeks in the Management of Non-Alcoholic Fatty Liver Disease (NAFLD)			
Role of mitochondrial calcium homeostasis in synovial fibroblast invasion: Unraveling new therapeutic intervention for Rheumatoid arthritis	Dr. Amit Lahiri	16-02-2023	15-02-2026
Evaluation and validation of bioactive glass-based micro nanofibre in non-healing chronic diabetic ulcer using animal models, as per regulatory guidelines	Dr. Srikanta Kumar Rath	01-03-2023	28-02-2026
Elucidating the role of O-fucosylation and C-mannosylation of malaria parasite proteins during host-parasite interactions	Dr. Satish Mishra	01-06-2023	31-05-2026
Characterization of the structure-function diversity of glycosomal proteins of Leishmania for the design and development of new anti-leishmanial agents	Dr. J. Venkatesh Pratap	15-06-2023	14-06-2026
Development of a reverse genetic system for Japanese Encephalitis virus as a tool to develop in vitro and in vivo antiviral screening platforms	Dr. Chetan Dewaji Meshram	01-01-2024	31-12-2026
Targeting bile acid receptor TGR5 for the treatment of ischemic cerebral stroke-associated motor & cognitive deficits	Dr. Prem Prakash Yadav	01-02-2024	31-01-2027
In silico design and synthesis of inhibitors targeting RNA editing pathway and assessing their anti-leishmanial efficacy *in vitro* and *in vivo* to generate anti-leishmanial agent	Dr. Bidyut Purkait	09-02-2024	08-02-2027
Drug development utilizing natural bioactive compounds for the sclerostin target in postmenopausal osteoporosis	Dr. Manish K Chourasia	15-02-2024	14-02-2028
Development of simultaneous dual action synthetic defence peptides to control the menace of drug resistance in ESKAPE pathogens: Targeting the antibiofilm and antimicrobial activities	Dr. Mukesh Pasupulati	01-03-2024	28-02-2027
Targeting mitochondrial fission with dietary molecules inhibits hepatic stellate cell activation and progression of non-alcoholic fatty liver disease: Pre-clinical & safety validation	Dr. Kumaravelu Jagavelu	21-02-2024	20-02-2027
Therapeutic targeting of HIF-1 α /VEGF pathway with Cannabidiol (CBD) analogues in cerebral stroke	Dr. Durga Prasad Mishra	16-02-2024	15-02-2027
Discovery and development of therapeutic interventions against multi-drug resistant bacterial pathogens	Dr. Radha Rangarajan	03-09-2024	02-09-2029
Bulk synthesis and dog toxicity study of small molecule Smac mimetic (S-016-1348) as an anticancer IND candidate	Dr. Dipak Datta	01-12-2024	30-11-2026
Targeting Nav 1.7 channels for the treatment of chronic pain	Dr. Aravind Singh Kshatri	13-01-2025	12-01-2028
Mucopenetrating TWEAK decoy for local delivery in Emphysematic lungs (MUTE): Preclinical validation in Chronic Obstructive Pulmonary Disease (COPD) model	Dr. Baisakhi Moharana	06-02-2025	05-02-2028
Ministry of AYUSH, Government of India			
Center of Excellence for Fundamental and Translation Research in Ayurveda	Dr. Manoj Kumar Barthwal	26-03-2024	25-03-2027
Council of Science & Technology, Uttar Pradesh			
To identify the level of UBA52 and peripheral inflammatory cytokines in blood and cerebrospinal fluid of Parkinson's disease patients to establish its diagnostic significance	Dr. Sarika Singh	18-06-2024	17-06-2027
Physiologically mimicking brown adipose tissue 3D bio-printing	Dr. Anil Nilkanth Gaikwad	21-11-2024	20-11-2027
NIPER, Kolkata			
Centre for Marine Therapeutics	Dr. Koneni V. Sashidhara	30-03-2023	29-03-2028
Ministry of Health and Family Welfare (Department of Health Research), India			
Harnessing therapeutic vulnerabilities of Triple Negative Breast Cancer (TNBC) through proteomic and metabolomics studies	Dr. Ratna Priya	07-10-2024	06-10-2027
Ministry of Earth Sciences, India			
Towards discovery and development of novel drugs and pharmaceuticals (Deep Ocean Mission)	Dr. Radha Rangarajan	27-01-2025	26-01-2027

Department of Scientific and Industrial Research and Council of Scientific & Industrial Research			
Creation of DSIR – Common Research and Technology Development Hub (CRTDH) in the area of affordable health under DSIR-CRTDH programme	Dr. Amit Misra	01-01-2019	30-09-2025
Ministry of Textiles under National Technical Textile Mission (NTTM)			
Functionalized textiles for germicidal applications	Dr. Sidharth Chopra	30-08-2024	29-01-2026
Biotechnology Industry Research Assistance Council (BIRAC)			
Therapeutics targeting of neutrophil extracellular traps nets in pulmonary fibrosis	Dr. Sachin Kumar	16-10-2023	15-10-2025
Early-stage pre-clinical development of stabilized peptide-based antibacterial agents for difficult to treat multidrug-resistant infections	Dr. Arunava Dasgupta	25-11-2024	24-05-2027
Lady Tata Memorial Trust, Mumbai			
Deciphering FLT3-ITD elicited signaling pathways in AML cell growth and block in differentiation: Hunt for therapeutic targets and inhibitors for mutant FLT3 proteins	Dr. Arun Kumar Trivedi	17-03-2021	31-03-2025
Ignite, Life Science Foundation			
Discovery and development of a novel Hv1 channel inhibitor to alleviate chronic pain	Dr. Aravind Singh Khatri	18-08-2023	17-08-2026
Targeting Morf412 alternative splicing to prevent cardiac cachexia	Dr. Shashi Kumar Gupta	18-08-2023	17-08-2026
Betalactonase as an antimicrobial	Dr. Mukesh Pasupuleti	26-03-2024	25-09-2025
Bill & Melinda Gates Foundation			
Target Enabling Packages for Nonhormonal Contraception	Dr. Radha Rangarajan	30-10-2023	14-10-2026
American Society of Hematology (ASH), Washington, D.C. United States			
Identification of molecular therapeutic target leading to development of chemo-resistance in non-GC DLBCL patients in India	Dr. Neeraj Jain	01-07-2021	30-11-2025
BFI, BIOME			
Discovery and development of novel small molecule adiponectin receptor agonists as orally-available therapeutics against skeletal muscle atrophy	Dr. Sabyasachi Sanyal	15-01-2025	14-07-2026
Late pre-clinical development of antimalarial candidate S011-1793	Dr. Saman Habib	15-12-2024	14-06-2026
Identification of lead-optimized candidates for dengue	Dr. Rahul Shukla	01-01-2025	30-06-2026
The Phaeo and Para Cancer Charity, Scotland (PPCC)			
Elucidating the neural role of SDHB1 in context of paraganglioma employing a new *C. elegans* model	Dr. Aamir Nazir	13-07-2022	12-07-2025

5.4 Sponsored Projects

Title of the Project	PI	Project Start Date	Completion Date
Sponsored Projects			
Pharmacokinetics study of α-β-Arteether formulation	Dr. Rabi Shankar Bhatta	30-05-2023	29-05-2024
Scaled-up synthesis, purification and assessment of chimeric hydrogen sulphide donor compounds for potential application to hypobaric hypoxia	Dr. Sanjay Batra	23-01-2023	22-01-2026
Phytochemical and immune modulator standardization of Ega-001	Dr. Asif Ali	20-06-2023	20-06-2024
Synthesis of new fluorescence quenchers with functional modifications for nucleic acid research	Dr. Atul Goel	11-09-2023	31-03-2025
Process optimization and synthesis of iodo acid intermediate	Dr. Ajay Kumar Srivastava	14-08-2023	13-08-2025
Investigation of metal-containing compounds for antimicrobial activity	Dr. Sidharth Chopra	15-02-2024	14-02-2025
Efficacy assessment of test agents on rats bones using microCT and bending strength analysis	Dr. Naibedya Chattopadhyay	23-02-2024	22-02-2025
To evaluate the anti-filarial efficacy of oxfendazole against human filarial nematode *Brugia malayi*	Dr. Mrigank Srivastava	11-03-2024	10-03-2025

Process optimization and synthesis of KSM-6: 3,4-Diamino-4-fluorobenzophenone	Dr. Ajay Kumar Srivastava	12-09-2024	11-03-2025
Process optimization and synthesis of Bis[3,4,6-trichloro-2-pentyloxycarbonyl) phenyl] Oxalate (CPPO)	Dr. Ajay Kumar Srivastava	12-09-2024	11-03-2025
FRNT-based *in vitro* screening of compound against DENV1- 4	Dr. Rahul Shukla	10-01-2025	09-07-2025
Consultancy Projects			
To resolve the obstacles related to the extraction & identification method of phytocannabinoids in *Cannabis sativa*	Dr. Asif Ali	17-07-2023	17-07-2024
Advisory consultancy on mass spectroscopy and NMR analysis	Dr. Sanjeev Shukla	29-05-2024	28-02-2025

5.5 Collaborative Projects

Title of the Project	PI	Project Start Date	Completion Date
Ministry of AYUSH			
Mechanistic studies with *Withania somnifera* extracts and its major phytoconstituents on innate immune cell responses and their efficacy in experimental animal models of immune-suppression and inflammation	Dr. Madhu Dikshit	31-05-2022	30-05-2025
Preclinical toxicity study of Dhatri Lauha	Dr. Srikanta Kumar Rath	17-02-2023	16-02-2025
Pre-clinical development of Vasa (*Justicia adhatoda* Linn.) leaves through AYUSH route for adjunct therapy in tuberculosis to reduce anti-tubercular treatment (ATT) induced hepatotoxicity	Dr. Virendra Kumar Maheshbhai Prajapati	25-02-2023	24-02-2025
Pre-clinical development of Amalaki (*Phyllanthus emblica* Linn.) fruit through AYUSH route for adjunct therapy in tuberculosis to reduce anti-tubercular treatment (ATT) induced hepatotoxicity	Dr. Srikanta Kumar Rath	25-02-2023	24-02-2025
Pre-clinical development of Guduchi (*Tinospora cordifolia*, (Thunb) Miers) stem through AYUSH route for adjunct therapy in tuberculosis to reduce anti-tubercular treatment (ATT) induced hepatotoxicity	Dr. Virendra Kumar Maheshbhai Prajapati	25-02-2023	24-02-2025

5.6 Corporate Social Responsibility Projects

Title of the Project	PI	Project Start Date	Completion Date
Creation of portable X-ray facility for experimentation and diagnostic use in laboratory animals	Dr. Divya Singh	12-12-2024	31-03-2026
To create a facility for oligonucleotide synthesis for biomedical research development of indigenous technologies	Dr. Atul Goel	28-03-2024	27-03-2026

6 Agreements/Memorandum of Understandings Signed

Sl. No.	Title of Contract / Agreement	Client / Collaborator	Signing Date
Licensing of Technology			
1.	A Standardized fraction of *Picrorhiza kurroa* for the treatment of Non-Alcoholic Fatty Liver Disease (NAFLD)	Themis Medicare Limited, Mumbai	17-01-2025
2.	TaqMan-like probe-based RT-PCR detection kit for arboviral infections (Dengue, Chikungunya, Zika)	Mylab Discovery Solutions Private Limited, Pune	17-01-2025
Collaborative Research Agreement			
1.	Development of in-house TaqMan-like probe-based RT-PCR detection kit for arboviral infections (DEN, CHIK, ZIKA)	King George's Medical University, Lucknow	13-11-2024
2.	Discovery and development of Sclerostin-targeting molecules for disease-modifying Osteoporosis therapy	Zydus Lifesciences Limited, Ahmedabad	13-09-2024
Sponsored Agreement			
1.	Process optimization and synthesis of ABT-5	Dr. Reddy's Laboratories Ltd., Hyderabad	07-10-2024
2.	FRNT-based *in vitro* screening of compound against DENV1-4	National Foods, Gujarat	08-01-2025
3.	Microneedle-based delivery of Minoxidil	Dr. Reddy's Laboratories Limited, Hyderabad	12-09-2024
4.	Process optimization and synthesis of KSM-6: 3,4-Diamino-4-fluorobenzophenone	Arkn Enterprises Pvt. Ltd., New Delhi	26-08-2024
5.	Process optimization and synthesis of Bis[3,4,6-trichloro-2-(pentyloxycarbonyl)phenyl] Oxalate (CPPO)	Arkn Enterprises Pvt. Ltd., New Delhi	26-08-2024
Consultancy			
1.	Consultancy on Mass Spectroscopy and NMR analysis	Jodas Expoim Pvt Limited, Telangana	27-05-2024
Memorandum of Understanding Signed for Joint R&D			
1.	To promote institutional linkage between CSIR-CDRI and JNCASR and to explore other avenues for possible collaboration	Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru	12-02-2025
2.	To promote institutional linkage between CSIR-CDRI and TCS and to explore other avenues for possible collaboration	Tata Consultancy Services Ltd, Mumbai	25-03-2025
3.	To promote institutional linkage between CSIR-CDRI and NIPER-M and to explore other avenues for possible collaboration	National Institute of Pharmaceutical Education and Research (NIPER), Mohali	24-01-2025
4.	To promote institutional linkage between CSIR-CDRI and NIPER-A and to explore other avenues for possible collaboration	National Institute of Pharmaceutical Education and Research (NIPER), Ahmedabad	21-03-2025
5.	To promote institutional linkage between CSIR-CDRI and IAV and to explore other avenues for possible collaboration	Institute of Advanced Virology, Thiruvananthapuram	24-02-2025
6.	To promote institutional linkage between CSIR-CDRI and CHINTA and to explore other avenues for possible collaboration	Centre for High Impact Neuroscience and Translational Applications (CHINTA), TCG CREST, Kolkata	17-02-2025
7.	To promote institutional linkage between CSIR-CDRI and KIIT and to explore other avenues for possible collaboration	Kalinga Institute of Industrial Technology (KIIT), Bhubaneswar	16-12-2024
8.	To promote institutional linkage between CSIR-CDRI and IITK and to explore other avenues for possible collaboration	Indian Institute of Technology (IIT), Kanpur	18-12-2024
9.	To promote institutional linkage between CSIR-CDRI and MAHE and to explore other avenues for possible collaboration	Manipal Academy of Higher Education, Manipal	11-12-2024

Sl. No.	Title of Contract / Agreement	Client / Collaborator	Signing Date
10.	To promote institutional linkage between CSIR-CDRI and ICGEB and to explore other avenues for possible collaboration	International Centre for Genetic Engineering and Biotechnology, New Delhi	23-10-2024
11.	Functionalized Textiles for Germicidal Applications	Uttar Pradesh Textile Technology Institute, Kanpur and Indian Institute of Technology (IIT), Kanpur	17-09-2024
12.	MoU for projects funding: I. Late pre-clinical development of antimalarial candidate S011-1793 II. Discovery and Development of novel small molecule Adiponectin Receptor Agonists as orally-available therapeutics against Skeletal Muscle Atrophy III. Identification of lead-optimized candidates for dengue.	IN COVID SUPPORT FZE LLC, United Arab Emirates	20-09-2024
13.	To promote institutional linkage between CSIR-CDRI and ICMR-NARFBR and to explore other avenues for possible collaboration	ICMR-National Animal Resource Facility for Biomedical Research, Hyderabad	30-07-2024
14.	Development of CSIR-Digital library of Indian medicinal plants and their metabolites	Bejoy Narayan Mahavidyalaya, West Bengal	18-07-2024
15.	To promote institutional linkage between CSIR-CDRI and SGRH and to explore other avenues for possible collaboration	Sir Ganga Ram Hospital, New Delhi	26-06-2024
16.	To promote institutional linkage between CSIR-CDRI and ICMR-NIV and to explore other avenues for possible collaboration	ICMR-National Institute of Virology, Pune	18-06-2024
17.	To promote institutional linkage between CSIR-CDRI and AIMS and to explore other avenues for possible collaboration	Amrita Institute of Medical Sciences & Research Center, Kerala	17-05-2024
18.	To develop synergetic collaborations in various areas of cancer biology	HealthCare Global Enterprises Limited, Bengaluru	03-05-2024
19.	To promote institutional linkage between CSIR-CDRI and LU and to explore avenues for possible collaboration in areas of mutual interest	University of Lucknow, Lucknow	08-04-2024
Co-Ownership and Commercialization Agreement			
1.	Target Identifizierung und hit to lead Optimierung von SRI-12742 gegen MDR *Acinetobacter baumannii* (SRI12742-H2L-MDRAB)	Helmholtz Zentrum für Infektionsforschung GmbH (HZI), Germany and Indian Institute of Technology (IIT) Kanpur	08-04-2024
CSR Agreement			
1.	Creation of portable X-ray facility for experimentation and diagnostic use in laboratory animals	Pharmanza Herbal Private Limited, Gujarat	12-12-2024
First Amendment of Clinical Trial Agreement			
1.	A Phase III, multicentre, randomized, double-blind, placebo-controlled, interventional study on efficacy and safety of Standardized fraction of *Picrorhiza kurroa* Royal Ex Benth (Picroliv®) for 24 weeks in the Management of Non-Alcoholic Fatty Liver Disease (NAFLD)	Institute of Liver and Biliary Sciences (ILBS), New Delhi	12-09-2024
Confidential Disclosure Agreement			
1.	For exploring businesses opportunities	Dr. K B Sunil Kumar, Consultant, Thiruvananthapuram	16-12-2024
2.	For exploring businesses opportunities	Encube Ethicals Private Limited, Mumbai	19-09-2024
3.	For exploring businesses opportunities	Etico Lifesciences Private Limited, Telangana	22-08-2024

Sl. No.	Title of Contract / Agreement	Client / Collaborator	Signing Date
4.	For exploring businesses opportunities	Medlis Healthcare Private Limited, Gujarat	20-08-2024
5.	For exploring businesses opportunities	Entod Pharmaceuticals Limited, Mumbai	30-07-2024
6.	For exploring businesses opportunities	Pharmazz India Pvt. Ltd, Greater Noida	16-07-2024
7.	For exploring businesses opportunities	Mylab Discovery Solutions Pvt. Ltd, Baner, Maharashtra	10-07-2024
8.	For exploring businesses opportunities	Yashraj Biotechnology Limited, Mumbai	03-06-2024
9.	For exploring businesses opportunities	Tata Memorial Hospital, Mumbai	18-06-2024
10.	For exploring businesses opportunities	Dr. Paresh Kishornbhai Dadhaniya, Gujarat	31-05-2024
11.	For exploring businesses opportunities	ITC LIMITED, Kolkata	29-05-2024
12.	For exploring businesses opportunities	IND SWIFT Limited, Jammu and Kashmir	23-04-2024
13.	For exploring businesses opportunities	IN COVID SUPPORT FZE LLC, United Arab Emirates	02-05-2024
Termination Agreement			
1.	A novel small molecule antiplatelet compound S007-867	MARC Laboratories Pvt., Ltd., Lucknow	08-10-2024
Memorandum of Agreement for Research Grants			
1.	Unraveling the novel interplay of ubiquitination in the regulation of gene expression	DBT, New Delhi	09-12-2024
2.	National Network Project of CSIR-Central Drug Research Institute, Lucknow	DBT, New Delhi	30-08-2024
3.	Understanding the role of Wat1/mLst8,TOR complex protein in the regulation of mitochondrial integrity and calcium ion homeostasis	DBT, New Delhi	25-04-2024
IP Expense Sharing Agreement			
1.	Tryptanthrin derivatives acting against drug resistant *Mycobacterium tuberculosis*, and a process for the preparation thereof	University of Kerala, Kerala	15-07-2024
Amendment to the Cooperation Agreement			
1.	Target Identifizierung und hit to lead Optimierung von SRI-12742 gegen MDR *Acinetobacter baumannii* (SRI12742-H2L-MDRAB)	Helmholtz Zentrum für Infektionsforschung GmbH (HZI), Germany and Indian Institute of Technology (IIT), Kanpur	20-01-2025
Material Transfer Agreement			
1.	Pad-Wnt3a(Plasmid #12518); Human Beta-catenin GFP(Plasmid #71367);pcDNA-Egr1(Plasmid#11729);pMIR-FLAG-MLL-AF9(Plasmid #71444);pBABE hygro MEN1WT(Plasmid #11024)	Addgene, USA	12-02-2025
2.	Plasmid-pShHELIX-sgRNA_entry (CJT32), pAcHELIX-sgRNA_entry (CJT94), pShHELIX(Cas12k-TniQ)-sgRNA_entry(CJ111), pSHELIX(Cas12k-TniQ-TniQ)-sgRNA_entry(CJT112), pSHELIX(Cas12k-TnsC)-sgRNA_entry(CGT113), pDonor14-ShHELIX-KanR(CJT70), pDonor14-N7HELIX-KanR, pDonor14-ShoHELIX-KanR(BO4)	Addgene, USA	27-02-2025
3.	Addgene 183701:AbVec_IGHC, Addgene 183702:AbVec_IGHC, Addgene 183703:AbVec_IGHC	Addgene, USA	13-02-2025
4.	73891 pFA6a-hygMV	Addgene, USA	20-01-2025
5.	Plasmids-pHAGENFKB, ptFLC3,PCDNA3, TFAM-mClover, pLJC5, pCDNA3TSC2, pEGFP-N1	Addgene, USA	06-01-2025

Sl. No.	Title of Contract / Agreement	Client / Collaborator	Signing Date
6.	pCDNA-4miD3CPV,PCDNA-03CPV	Addgene, USA	12-11-2024
7.	Flag-APEX pCDNA-N002, pCDNA 3.1-GFP(1-10) pCDNA-GFP11-Clathrin, pCHV-Hyper7 NEH	Addgene, USA	18-10-2024
8.	Small molecules, New Chemical entities	Kainomyx Research Laboratories Limited, Bengaluru	02-09-2024
9.	Frozen and formaldehyde fixed *Brugia malayi* adult worm (n=10) and microfilariae (n=3*106). Serum from uninfected and *B. malayi* infected *Mastomys coucha* (500 µl each)	Kazi Nazrul University, Asansol, West Bengal	29-08-2024
10.	Plasmid PMD 2.G (# 12259) PSPAX@ (#12260), PLV-eGFP(#36083)	Addgene, USA	09-08-2024
11.	Antibodies (polyclonal sera) against PfHU and PfExo proteins.	University of Hyderabad, Hyderabad	19-07-2024
12.	Plasmids (pOK12#49789, pBeloBac11IpxP2272#60342, pWSK29 #172972)	Addgene, USA	24-06-2024
13.	Plasmids (50464, 50465, 50463, 50458, 81241, 47906, 47903, 97155, 196267, 189866)	Addgene, USA	08-05-2024

7 PhD Thesis Submitted

7.1 Ph. D. thesis submitted during April 2024- March 2025

Sl. No.	Name of Student	Title	Name of Supervisor	Date
		Jawaharlal Nehru University, New Delhi		
1.	Pooja Gupta	Exploring the novel and unconventional molecules as nest generation therapeutics	Dr. Mukesh Pasupuleti	17.05.2024
2.	Sanoop P. C	Expeditious general approaches to important organofluorine compounds employing fluorocarbon nucleophiles	Dr. Kishor Mohanan	31.05.2024
3.	Ariza Khanam	Synthetic strategies for stereoselective glycosylation to access structurally significant glycoconjugates	Dr. Pintu K Mandal	14.06.2024
4.	Indranil Chatterjee	An approach to amino acid-based Bucky-bowl derivatives and heterocycles as therapeutic agents	Dr. Gautam Panda	28.06.2024
5.	Sunaina Kumari	Deciphering the role of RNA-binding proteins and circular RNAs in Metabolic syndrome	Dr. Shashi Kumar Gupta	08.07.2024
6.	Abdul Akhir	Identification and detailed evaluation of antibacterial molecules against human pathogenic bacteria	Dr. Sidharth Chopra	15.07.2024
7.	Shriya Singh	Deciphering the role of galactokinase (Rv0620) in mycobacterial physiology and bio-evaluation of phosphorous dendrimers against *Mycobacterium tuberculosis*	Dr. Arunava Dasgupta	18.07.2024
8.	Abhipsa Sinha	Understanding the contribution of lipid metabolism in the pathophysiology of breast cancer	Dr. Dipak Datta	18.07.2024
9.	Arpita Banerjee	An odyssey towards amino acid & heterocyclic based privileged structures as pharmacologically active agents	Dr. Gautam Panda	24.07.2024
10.	Vrushti Telang	Next generation antimicrobial agents: discovery to development for therapeutic applications	Dr. Mukesh Pasupuleti	26.07.2024
11.	Suman Yadav	Transition metal-catalyzed reactions of quinoline and other heterocycles	Dr. Malleswara Rao Kuram	29.07.2024
12.	Dhananjay Chaudhary	Transition Metal-Catalyzed cascade reactions of allenes: Synthesis of Oxygen and nitrogen-containing heterocycles	Dr. Malleswara Rao Kuram	29.07.2024
13.	Amit Singh Adhikari	Transition metal-catalyzed asymmetric ring opening reactions and study towards drugs repurposing	Dr. Nilanjana Majumdar	31.07.2024
14.	Rafquat Rana	Design and development of brain-targeted biomimetic drug delivery system	Dr. Manish K. Chourasia	31.07.2024
15.	Farah Gulzar	Investigating the role of nucleotide-binding oligomerization domain proteins in development of NAFLD	Dr. Akhilesh K. Tamrakar	31.07.2024
16.	Sandeep Kumar	Employing diazo compounds as useful synthons for the expedient construction of heterocycles	Dr. Kishor Mohanan	31.07.2024
17.	Anamika Dhami	Novel strategies for the construction of heterocyclic building blocks employing diazo compounds	Dr. Kishor Mohanan	31.07.2024

18.	Gayyur	Exploring novel methods for the synthesis of medium-sized O/N- heterocycles and their applications in drug discovery	Dr. Nayan Ghosh	31.07.2024
19.	Priyanka Pandey	π-Conjugated donor-acceptor based aromatic compounds and their biomedical applications	Dr. Atul Goel	31.07.2024
20.	Aastha Varshney	Elucidating the role of sporozoite-specific proteins in *P. berghei* using reverse genetic approaches	Dr. Satish Mishra	31.07.2024
21.	Pratiksha Tiwari	Design and evaluation of targeted drug delivery system for the treatment of solid tumors	Dr. Prabhat Ranjan Mishra	31.07.2024
22.	Km Kajol	Development of novel methods for the synthesis of heterocycle and their biological activity evaluation	Dr. Ramesh Chintakunta	22.08.2024
23.	Garvita Mishra	Studies on the functional characterization of RNA editing ligase 1 (REL1) of *Leishmania donovani* and checking its involvement in mitochondrial metabolism and parasite survival inside the host	Dr. Bidyut Purkait	29.08.2024
24.	Shiv Shankar Patel	Development of sustainable photocatalytic reactions	Dr. Chandra Bhushan Tripathi	02.09.2024
25.	Ajay Kishor Kushawaha	Synthesis of nitrogen-containing privileged heterocycles as potential biodynamic agents and development of synthetic strategies	Dr. K. V. Sashidhara	27.09.2024
26.	Arvind Kumar Jaiswal	Diversity-oriented synthesis as a tool for the development of new biodynamic agents	Dr. K. V. Sashidhara	27.09.2024
27.	Nishakumari Chentunarayan Singh	*In-vitro* evaluation of anticancer agents and their cell death modalities on triple-negative breast cancer cells	Dr. Kalyan Mitra	30.09.2024
28.	Raj Kishore	Exploring the sensitivity of ESKAPE pathogens towards peptides mimetics: An answer to antimicrobial resistance	Dr. Mukesh Pasupuleti	10.10.2024
29.	Shamima Khatoon	Dissecting the role of ACG an AdipoR agonist and elucidating its protective role in NAFLD/NASH	Dr. Sabyasachi Sanyal	06.11.2024
30.	Anchal Saxena	Multicomponent domino/cascade cyclization reactions: systematic construction of biologically relevant heterocycles	Dr. Nayan Ghosh	07.11.2024
31.	Arpon Biswas	Development of surface-modified nanoformulation for non-invasive delivery of steroids to ocular tissues and preclinical pharmacokinetic studies of chebulinic acid	Dr. Rabi Sankar Bhatta	18.11.2024
32.	Tribeni Chatterjee	Analysis of biochemical functions of putative exonucleases in organellar DNA repair and maintenance of the malaria parasite	Dr. Saman Habib	04.12.2024
33.	Farheen Jahan	Molecular mechanisms underlying the functions of DNA repair complex(es) in *Mycobacterium tuberculosis*	Dr. Ravishankar Ramachandran	24.12.2024
34.	Divyansh Sharma	Studies on amelioration of malathion-induced neurotoxicity by hydroalcoholic extract of *Cynodon dactylon*	Dr. S. K. Rath	26.12.2024

35.	Raj Kumar Patel	Synthesis of polycyclic heterocycles via desymmetrization strategy	Dr. Ravindra Kumar	30.12.2024
36.	Priyankar Jha	Development of synthetic method for α-functionalization of amines towards diverse aza-heterocycles	Dr. Ravindra Kumar	30.12.2024
37.	Soumen Pandit	Catalytic asymmetric synthesis of medicinally important scaffolds for drug discovery	Dr. Nilanjana Majumdar	30.12.2024
38.	Sariyah Akhtar	Design and characterization of antimicrobial peptides with modulation of secondary structures	Dr. Jimut Kanti Ghosh	15.01.2025
39.	Alok Kumar Yadav	Immunotherapeutic strategies with chimera AT against visceral leishmaniasis	Dr. Amogh A. Sahasrabuddhe	20.01.2025
40.	Dileep Kumar	Exploration of phosphorylation quinomethylation chemistry and development of epigenetic regulator	Dr. Chandra Bhushan Tripathi	21.01.2025
41.	Rohit Singh Rawat	Decoding the role of autophagy in chemoresistance: Emphasis on breast cancer	Dr. Dibyendu Banerjee	30.01.2025
42.	Apurwa Singhal	To investigate clearance of neutrophils and remnants in the resolution of inflammation	Dr. Sachin Kumar	31.01.2025
43.	Geeta Dhaniya	Effect of chronic stress on the pathogenesis osteoarthritis	Dr. Ritu Trivedi	03.02.2025
44.	Konica Porwal	Discovery of phosphodiesterase inhibitors with osteoanabolic effect through therapeutic repurposing and screening of novel synthetic compounds	Dr. Naibedya Chattopadhyay	28.03.2025
Academy of Scientific and Innovative Research (AcSIR), Ghaziabad				
1.	Qumruddeen	Development and applications organocatalytic thiocyanation reactions	Dr. Chandra Bhushan Tripathi	08.04.2024
2.	Santosh Kumar	Green synthesis of some privileged heterocyclic-based compounds and their biological activities	Dr. Ravindra Kumar	12.04.2024
3.	Shivangi Gupta	Investigation on the role of angiotensin-converting enzyme2/Angiotensin(1-7)/mas receptor axis during neurodegeneration	Dr. Shubha Shukla	19.04.2024
4.	Nilesh Khandelwal	Functional alterations in adipose tissue glucose homeostasis: Underlying epigenetic modulations and ameliorative therapeutics strategies	Dr. Anil N. Gaikwad	23.04.2024
5.	Desh Raj	Investigating the role of peroxisome during Salmonella infection and in mucosal inflammation	Dr. Amit Lahiri	29.04.2024
6.	Sonu Khanka	Deciphering the role of novel pyrimidine derivatives in promotion of osteogenesis and mitigation of glucocorticoid-induced osteoporosis	Dr. Divya Singh	30.04.2024
7.	Sonam Kanchan	Effect of PLGA/PF127 encapsulated salinomycin nanoparticle apoptosis of prostate cancer	Dr. S. K. Rath	14.05.2024
8.	Monika Patel	To investigate the role and mechanism of CXCL10 chemokine and other neuropeptides in brain ageing	Dr. Prem N. Yadav	15.05.2024
9.	Jyotsna Sharma	Understanding the role of endoplasmic Reticulum-mitochondria contacts in inflammation during ulcerative colitis	Dr. Amit Lahiri	27.05.2024

10.	Vikash Yadav	Structural and functional characterization of PadR family protein Rv1176c of *Mycobacterium tuberculosis* H37Rv	Dr. Ashish Arora	06.06.2024
11.	Sarita Katiyar	Natural product-inspired synthesis of bioactive compounds and their bio-evaluation	Dr. K. V. Shashidhara	26.06.2024
12.	Deepak Kumar	Investigating the role of high-risk human Papilloma Virus E5 protein in regulation of cross-talk of apoptosis signals between mitochondria and endoplasmic reticulum	Dr. Jayanta Sarkar	11.07.2024
13.	Sharmeen Ishteyaque	Implication and regulation of CYP2E1 in hepatocarcinogenesis	Dr. Madhav N. Mugale	15.07.2024
14.	Muhammad Zohib	Characterization of stability and structures of early endocytosis-related rab proteins of *Leishmania donovani*	Dr. Ashish Arora	15.07.2024
15.	Swati Rajput	Pharmacologic targeting of mitochondrial function for novel class of osteoporosis therapy	Dr. Naibedya Chattopadhyay	30.07.2024
16.	Arun Yadav	Development of catalytic photoinduced olefinic functionalization	Dr. Chandra Bhushan Tripathi	01.08.2024
17.	Pinaki Prasad Mahapatra	Functional characterization of fission yeast Bsd1, a NEDD4 interacting protein in metal and endoplasmic reticulum stress and through overexpression	Dr. Shakil Ahmed	02.08.2024
18.	Pallavi Saini	To investigate the role of HOXB1 in spermatogenesis and male infertility	Dr. Rajender Singh	05.08.2024
19.	Deepak Bhadoria	Natural product inspired design and synthesis of new heterocycles as bioactive agents	Dr. Kinshuk Raj Srivastava	05.08.2024
20.	Shaifali Tyagi	Synthesis of azole derivatives using sustainable methodologies and their biological evaluation	Dr. Prem Prakash Yadav	05.08.2024
21.	Rachana Meena	Metal-free functionalization of peptides and bactericidal activity of salicylamide conjugates and heterochiral helical peptides	Dr. Damodara Reddy N	07.08.2024
22.	Nikita Sudarshan	Understanding the role of RNA polymerase II CTD phosphorylation during mRNA transcription	Dr. Md. Sohail Akhtar	07.08.2024
23.	Anjali	Antibody response to human POTE protein, POTEE in mice and its role in the early detection of malignant cells	Dr. Raj Kamal Tripathi	07.08.2024
24.	Swetapadma Majhi	Elucidation of the cell death pathways triggered by potential anti-leishmanial agents of the naphthoquinone class	Dr. Kalyan Mitra	07.08.2024
25.	Neelam Gupta	Studies on mechanism of drug resistance in cancer	Dr. Durga Prasad Mishra	17.09.2024
26.	Abhishek Nirwan	Targeting angiogenesis in liver fibrosis	Dr. Durga Prasad Mishra	24.09.2024
27.	Divya Chauhan	Combinatorial delivery of Cladrin and Reloxifene for the treatment of osteoporosis	Dr. Jiaur R Gayen	18.10.2024
28.	Sakesh Kumar	Characterization of dopamine receptor D5(DRD5) in cognitive functions	Dr. Prem N Yadav	01.10.2024
29.	Neha Singh	Rational approach in developing lipid-based nanoconstructs for improved chemotherapy	Dr. Prabhat Ranjan Mishra	05.11.2024

30.	Saddam Husen	Site-selective synthesis of multi-functional aromatics from p-quinol via neighboring group-directed strategy and total syntheses of Millingtonine and Incargranine A	Dr. Ravindra Kumar	08.11.2024
31.	Shabina Bee Ansari	Design and Synthesis of N-arylpiperazine containing anti-infective agents and methodology development for the total synthesis of natural product Darobactin A	Dr. Damodara Reddy N	29.11.2024
32.	Promila	Delineating the crosstalk between mitochondrial calcium uniporter and mitochondrial dynamics in the pathogenesis of rheumatoid arthritis	Dr. Amit Lahiri	29.11.2024
33.	Shivani Mishra	Analysis of organeller DNA repair proteins putatively involved in the processing of DNA termini and mismatch repair in the malaria parasite	Dr. Saman Habib	13.12.2024
34.	Arvind Gupta	Identification and characterization of short protein fragments with anti-diabetic property	Dr. Jimut Kanti Ghosh	24.12.2024
35.	Washimkar Kaveri Rajaram	Elucidation of molecular mechanisms and metabolic alteration in pulmonary fibrosis	Dr. Madhav Nilakanth Mugale	30.12.2024
36.	Anjum Bano	Identification, cloning and characterization of genes involved in the biosynthesis of secondary metabolites from *Eclipta prostrata* (L.) L.	Dr. Vineeta Tripathi	31.12.2024
37.	Shashank Shekhar	Transition metal-catalyzed C-H and N-H functionalization of bioactive small molecules and peptides	Dr. Damodara Reddy N	06.01.2025
38.	Naveen Kumar Maurya	Exploration of cyclic diaryliodonium salt as biarylating agents: Synthesis of biological relevant molecules	Dr. Malleswara Rao Kuram	06.01.2025
39.	Akansha Singh	Novel synthetic strategies for boron (B-O/B-N) heterocycles of pharmaceutical importance	Dr. Ravindra Kumar	06.01.2025
40.	Nahiyera Milind Kantilal	Identification of phenotypic and functional heterogeneity of neutrophils in pathophysio logical conditions	Dr. Sachin Kumar	06.01.2025
41.	Madhu Patel	Identification of atypical RNAPII-CTD phosphatases and their role in transcription cycle	Dr. Mohd. Sohail Akhtar	06.01.2025
42.	Shivani Choudhary	Exploring reactivity of alkyne-rich ynamides: Synthesis of medium-sized N-heterocycles and bioactivity studies	Dr. Nayan Ghosh	07.01.2025
43.	Arppita Sethi	Deregulation of deubiquitanases and their implications in cancer pathogenesis	Dr. Arun Kumar Trivedi	15.01.2025
44.	Abhinav Singh	Exploring the therapeutic potential and molecular mechanism of hepatoprotective compounds in non-alcoholic fatty liver disease	Dr. Kumaravelu Jagavelu	31.01.2025
45.	Carol Janis Bilung	Enrichment of targeted indole alkaloids from *Alstonia scholaris* through biotechno-logical approaches and characterization of selected biosynthetic gene	Dr. D. K. Mishra	25.02.2025
46.	Saurabh Kumar Kaushal	Exploring the role of novel osteogenic agents against age-related bone loss and neurodegeneration	Dr. Divya Singh	25.03.2025
47.	Khushboo Verma	Dry powder inhalation of Mycobacteroides abscessus for development of a preclinical model of non-tubercular mycobacterial lung disease in mice	Dr. Amit Misra	27.03.2025

8 Skill Development Training

The Skill Development Program at CSIR-Central Drug Research Institute, Lucknow, is a pioneering initiative aimed at equipping India's youth with the practical skills and exposure needed to thrive in a rapidly evolving professional landscape. In a world where knowledge alone is no longer sufficient, this program bridges the gap between education and employability by offering experiential learning across critical domains in healthcare and life sciences.

In the 2024-2025 cycle, the program engaged 279 participants through 13 specialized training modules, demonstrating significant outreach and diversity. A strong emphasis on inclusivity was evident:

- 68% of the participants were female, highlighting commendable gender representation.
- Nearly 45% of participants came from rural areas, reinforcing the program's reach into underrepresented communities.

These sessions were conducted by senior R&D scientists and experts, ensuring not only high-quality training but also valuable mentorship. Programs ranged from postgraduate skill-building (Skill Development Program for Post-Graduate Students) to advanced thematic workshops (like Advanced course on Care, Management of Laboratory Animals & Experimental Techniques and Pathological Tools & Techniques for biomedical applications), many of which achieved feedback ratings of over 90%, reflecting high participant satisfaction.

This initiative doesn't merely impart technical knowledge—it fosters confidence, cultivates curiosity, and empowers youth for real-world challenges. By nurturing talent at the grassroots and bridging academic-practical divides, the Skill Development Program plays a vital role in advancing individual careers and contributing to India's broader developmental goals.

Sl. No.	Skill Development Training Programs	No. of Trainees	Name of the Coordinators
1.	Skill Development Program for Post-Graduate Students	169	All R&D Scientist
2.	Advanced Training Program for the Trainees	07	All R&D Scientist
3.	Training for Scholarship Awardees • Indian Academy of Sciences, INSA-IASc-NASI Summer Research Fellowship • INSPIRE Fellowship • UPCST Fellowship • MPCST	15	All R&D Scientist
4.	Skill Development Training	01	All R&D Scientist
5.	Summer Training	23	All R&D Scientist
6.	Advanced course on Care, Management of Laboratory Animals & Experimental	15	Dr. Rajdeep Guha
7.	Pathological Tools & Techniques for Biomedical Applications	20	Dr. Madhav Nilakanth Mugale
8.	Advanced Spectroscopic (NMR, HPLC LC-MS, UV/IR) Techniques	16	Dr. Sanjeev K. Shukla
9.	Basic Training in Electron Microscopy Techniques for Life Sciences	06	Dr. Kalyan Mitra
10.	Computational Approaches to Drug Design and Development	07	Dr. M.I. Siddiqui

9 Honours & Awards

Faculty Achievements

(Awards, Fellow of Academy/ Society, International Fellowships, Exams Qualified)

Dr. S. K. Rath

- Awarded as a Fellow of the Society of Toxicology at the 43rd Annual STOX Meeting

Dr. Atul Goel

- IAAM Medal-2024 by the International Association of Advanced Materials, Sweden

Dr. Gautam Panda

- Utkal University Lecture Series Award, Utkal University, Bhubaneswar

Dr. Ritu Trivedi

- Listed in the top 100 Asian Scientists by Asian Scientist Magazine 2024

Dr. Aamir Nazir

- Elected as a Fellow of the Indian Academy of Neurosciences at the 42nd Annual Meeting of the academy at NIMHANS, Bengaluru

Dr. Damodar Reddy N

- IPS – Young Scientist Award by the Indian Peptide Society

Dr. Vivek Vidydhar Bhosale

- Elected Member of the National Academy of Medical Sciences, India, 2023

Dr. Monika Sachdev

- Dr. (Mrs.) Mridula Kamboj Memorial Oration Award 2025 at International Conference on Reproductive Biomedicine: Integrating Basic Biological and Applied Research into Clinical Practice for Human Welfare & 35th Annual Meeting of the Indian Society for the Study of Reproduction and Fertility (ISSRF-2025)

Dr. Namrata Rastogi

- CRS Bronze Medal Award-2024 by the Chirantan Rasayan Sanstha
- SERB – POWER Fellowship By DST – SERB (ANRF), Govt. of India

Dr. Madhav N Mugale

- ICMR-DHR Long Term International Fellowships for the Young Indian Biomedical Scientist for the Year 2024-25 for Pursuing One-year Advanced Research at Wexner Medical Center, USA
- Certified as a Diplomate of the American Board of Toxicology (DABT)

Dr. Amit Lahiri

- Raman Research Fellowship to Carry Out Research on Deciphering the Function of C1orf53, a Mitochondrial Protein Related to Inflammatory Bowel Disease GWAS with Prof. David Pla Martín, Institute of Biochemistry and Molecular Biology, University Hospital Düsseldorf, HHU, Germany

Dr. Nilanjana Majumdar

- Thieme Chemistry Journals Award by Thieme Chemistry

Students Achievements

(Awards, International Fellowships, International travel grants)

Ms. Sandhya Singh

(Student of Dr. Shashi Kumar Gupta)

- Prof. S. C. Tyagi Award in Oral Presentation 2 Joint Annual Meeting of International Society for Heart Research (Indian Section) & International Academy of Cardiovascular Sciences (Indian Section), organized by Department of Cardiology, AIIMS Jodhpur

Ms. Sunaina Kumari

(Student of Dr. Shashi Kumar Gupta)

- Second prize in Paper Presentation (Oral Presentation in Invited abstract) in The Heart Failure Conflux 2024

Mr. Devanshu Kaushik

(Student of Dr. Prem N Yadav)

- 5th Science Conclave-cum-National Biomedical Research Competition (NBRCOM, 2024) held on 1-3rd Dec 2024, organized by JNU & AIIMS, New Delhi.

Mr. Avinash Madhesiya

(Student of Dr. Tejender S. Thakur)

- International travel support from ANRF for participating in the 3rd International Conference on Noncovalent Interactions from June 17th to 21st 2024, in Belgrade, Serbia

Ms. Sonu Khanka

(Student of Dr. Divya Singh)

- EAST MEET WEST AWARD at ECTS congress held in Marseille, France from 25th to 28th May 2024
- Best Oral Presentation at 5th Science Conclave-cum-National Biomedical Research Competition (NBRCOM, 2024) held on 1-3rd Dec 2024, organized by JNU & AIIMS, New Delhi.

Ms. Raksha Devi

(Student of Dr. Satish Mishra)

- Young Scientist Award-2024 by Indian Society of Parasitology at 32nd National Congress on Parasitology

Ms. Aastha Varshney

(Student of Dr. Satish Mishra)

- Prof. M.B. Mirza Award & Best Poster Award 2024 by Indian Society of Parasitology
- Young Researcher Award, at 5th Science Conclave-cum-National Biomedical Research Competition (NBRCOM, 2024) held on 1-3rd Dec 2024, organized by JNU & AIIMS, New Delhi.

Ms. Shivani Mishra

(Student of Dr. Samam Habib)

- Honorable Mention Online Poster Award

Mr. Amrish Rai

(Student of Dr. Aamir Nazir)

- Jyotsnamoyee Raghunath Bhattacharya Prize at the 42nd Annual meeting of Indian Academy of Neurosciences
- Best Flash Talk Award at 9th CTDDR organized by CSIR-CDRI

Ms. Ipsha Shruti

(Student of Dr. Tejender S. Thakur)

- International travel support from ANRF for participating in the 18th conference of the Asian Crystallographic Association (AsCA 2024) in Kuala Lumpur, Malaysia

Ms. Sharmeen Ishteyaque

(Student of Dr. Madhav Nilakanth Mugale)

- Young Researcher Award, at 5th Science Conclave-cum-National Biomedical Research Competition (NBRCOM, 2024) held on 1-3rd Dec 2024, organized by JNU & AIIMS, New Delhi.

Mr. Kunal Chutani

(Student of Dr. Ritu Trivedi)

- Best oral Presentation Award at 5th Science Conclave-cum-National Biomedical Research Competition (NBRCOM, 2024) held on 1-3rd Dec 2024, organized by JNU & AIIMS, New Delhi.

Ms. Plabita Paul

(Student of Dr. Satish Mishra)

- Outstanding Presenter Award at 7th Regional Science & Technology Congress 2024-25, Birbhum, West Bengal
- Outstanding Poster Award at 32nd West Bengal State Science & Technology Congress, Kolkata, West Bangal

Ms. Rohini Nandi

(Student of Dr. Satish Mishra)

- Outstanding Presentation Award at 7th Regional Science & Technology Congress 2024-25, Birbhum, West Bengal

Ms. Garvita Mishra

(Student of Dr. Bidyut Purkait)

- Best Poster Award at the National Congress of Parasitology held at IISER, Pune, October 2024
- Best Poster Award at 9th CTDDR held at CSIR-CDRI, Lucknow, February 2025

Mr. Saumya Ranjan Satrusal

(Student of Dr. Dipak Datta)

- Best Poster Presentation Award at 44th Annual Meeting of IACR 2025

Ms. Rosani Kumari Shaw

(Student of Dr. D. K. Mishra)

- Best Poster Award in IORA-AMAR 2025, Organized by ICCMP & CSIR-CIMAP, Lucknow

Mr. Aakash Gaur

(Student of Dr. Shashi Kumar Gupta)

- First Prize in Paper Presentation at Heart Failure Conflux 2025, Trivandrum
- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Mr. Devendra Pratap Singh

(Student of Dr. Divya Singh)

- Best Oral Presentation Award at International Symposium on Recent Advances in Disease Biology and Emerging Therapeutics (RADBET), BHU 2025
- Best Flash Talk Award at 9th CTDDR organized by CSIR-CDRI

Mr. Shubhrajyoti Das

(Student of Dr. Sabyasachi Sanyal)

- Best Oral Presentation Award at International Symposium on Recent Advances in Disease Biology and Emerging Therapeutics (RADBET), BHU 2025
- Certificate for Honorable Mention for Oral Presentation, Department of Zoology, Institute of Science, Banaras Hindu University, Varanasi

Mr. Rajesh Kumar

(Student of Dr. Kinshuk Raj Srivastava)

- Best Poster Award at 33rd CRSI National Symposium in Chemistry organised by Dr. Reddy's Laboratories Ltd.

Ms. Akansha Singh

(Student of Dr. Ravindra Kumar)

- Best Poster Award in XIX J-NOST 2024 held at IIT Gandhinagar
- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Ms. Nisha Gupta

(Student of Dr. Atul Goel)

- Best oral presentation in ICCHD-2025 Conference in Kolkata

Ms. Shruti Sethi

(Student of Dr. Rajender Singh)

- International travel support from ANRF for participating in the ESA-SRB-ANZBMS 2024 in conjunction with ENSA. Australia, 10-13 Nov 2024

Mr. Sachin Sanap

(Student of Dr. Rabi Bhatta)

- AcSIR-Best Thesis Award -2023

  (Thesis title: Development of Sustained Release Ophthalmic Formulation Containing Anti-infective Drugs for the Management of Polymicrobial Keratitis)

Ms. Suchitra Gupta

(Student of Dr. Atul Goel)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Ms. Aradhana Chauhan

(Student of Dr. Atul Goel)

- Best Poster presentation in ICCHD-2025 Conference in Kolkata

Mr. Indranil Chatterjee

(Student of Dr. Gautam Panda)

- Best Poster Award at NIICT - 2024: Nature Inspired Initiative in Chemical Trends, CSIR - IICT, Hyderabad, India

Dr. Himalaya Singh

(DBT- RA- Student of Dr. Kumaravelu Jagavelu)

- Best Oral Presentation Competition in the Young Faculty Prize in the Miscellaneous (Basic) category at IPC-IPSCON 2024

Dr. Sakshi Mishra

(DST Women Scientist, Division of Toxicology)

- Best Presentation Award at the International Conference on Current Trends in Toxicology and the 43rd Annual Meeting of the Society of Toxicology, INDIA (STOX 2024)

Ms. Supriya Sinha

(PhD student of Dr. Sachin Kumar)

- Best Poster Presentation Award at Global Immunology Summit, THSTI Faridabad

Mr. Anurag Singh

(PhD student of Dr. Ravishankar Ramachandran)

- Royal Society of Chemistry (RSC) Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Ms. Himanshi Rawat

(PhD student of Dr. Shubha Shukla)

- First Prize in Video Production Competition organized by CSIR-CDRI

Mr. Rahul Roy

(Student of Dr. Mrigank Srivastava)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Ms. Tribeni Chatterjee

(Student of Dr. Saman Habib)

- Best Flash Talk Award at 9th CTDDR organized by CSIR-CDRI

Mr. Anirban Sardar

(Student of Dr. Ritu Trivedi)

- Best Poster Award The 9th "International Symposium on Current Trends in Drug Discovery Research (CTDDR-2025)

Ms. Annu Yadav

(Student of Dr. Prem N. Yadav)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Ms. Ayushi Devendrasingh Chaudhary

(Student of Dr. Shashi Kumar Gupta)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Ms. Eisha Pandey

(Student of Dr. Satish Mishra)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Mr. Jay Gupta

(Student of Dr. Koneni V Sashidhara)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Mr. Mandweep Bhumij

(Student of Dr. Ajay Kumar Srivastava)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Mr. Moinuddin

(Student of Dr. Smrati Bhadauria)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Ms. Nikita Chhikara

(Student of Dr. Akhilesh Tamrakar)

- Best poster awards during 9th International Conference on Current Trends in Drug Discovery Research (CTDDR 2025) at CSIR-CDRI, Lucknow, India.

Ms. Sahitya Uppada

(Student of Dr. Manoj Kumar Barthwal)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Mr. Souvik Barman

(Student of Dr. Gautam Panda)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Ms. Udita Jindal

(Student of Dr. Neeraj Jain)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Ms. Zanjila Azeem

(Student of Dr. Pintu Kumar Mandal)

- Best Poster Award at 9th CTDDR organised by CSIR-CDRI

Ms. Ankita Paul

(Student of Dr. Divya Singh)

- 1st prize in Oral Presentation in IITR, Lucknow

Ms. Akanksha Singh

(Student of Dr. Rajesh Jha)

- Best poster at 9th CTDDR organised by CSIR-CDRI

Mr. Md Rameez Moin

(Student of Dr. Sabyasachi Sanyal)

- Young Researcher Award 2024 for poster presentation in Pharmaceutical Sciences, All India Institute of Medical Sciences (AIIMS), New Delhi and Special Centre for Molecular Medicine (SCMM), JNU, New Delhi

Mr. Abdul Basit Khan

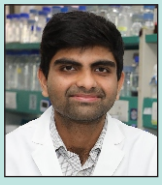
(Student of Dr. J. V. Pratap)

- EMBO International Travel Grant to attend EMBO Practical Course on Time Resolved Macromolecular Serial Crystallography held at EMBL, Grenoble, France between 8-12th July 2024

Mr. Shivam Sahu

(Student of Dr. J. V. Pratap)

- Received UKRI-STFC Travel Bursary to attend CCP4 - Study Weekend 2025, which was held at East Midlands Conference Centre, Nottingham, UK, between 7-9th January 2025
- Ignite Life Science Foundation (India) International Travel Grant to visit the University of Oxford, Diamond Light Source, as well as the University of Cambridge, to get hands-on training on cryo-EM grid preparation.



Excellence in Sports

Women's Badminton Singles and Doubles Champion,
51st Shanti Swarup Bhatnagar Memorial Tournament 2024, CSIR-IMMT, Bhubaneswar

Men's Cricket Champion, 52nd Shanti Swarup Bhatnagar Memorial Tournament (SSBMT), Outdoor Zonal at CSIR-NCL, Pune

Men's Volleyball Runner-Up, 52nd Shanti Swarup Bhatnagar Memorial Tournament (SSBMT), Outdoor Zonal at CSIR-NCI, Pune

Section III

Facilities and Management

GOVERNMENT OF INDIA
Department of Science and Technology
National Good Laboratory Practice (GLP) Compliance Monitoring Authority (NGCMA)

Certificate of GLP Compliance

This is to certify that

CSIR-Central Drug Research Institute
Sector 10, Jankipuram Extension
Sitapur Road, Lucknow- 226031 (Uttar Pradesh), India

is a GLP certified test facility in compliance with the NGCMA's Document No. GLP-101 "Terms & Conditions of NGCMA for obtaining and maintaining GLP certification by a test facility" and OECD Principles of GLP.

The test facility conducts the below-mentioned tests/ studies:

- **Toxicity Studies**
- **Mutagenicity Studies**
- **Others**

The specific areas of expertise, test item and test systems are listed in the annexure overleaf.

Generating a Peptide Library Using the Repeats of Amino Acid Scaffolds Created by Sliding the Framework of a 7-mer Human Chemerin Segment and Discovery of Potent Antibacterial and Antimycobacterial Peptides

Sariyah Akhtar, Mohd Mustkim Ansari, Rahul Dev Verma, Juhi Sharma, Arvind Gupta, Rajendra Kumar Dhuriya, Devesh Pratap Verma, Jyotshana Saroj, Mehmood Ali, Neeraj Ku
Kalyan Mitra, Bhupendra Narain Singh, and Jimut Kanti Ghosh*

Cite This: J. Med. Chem. 2025, 68, 566−589

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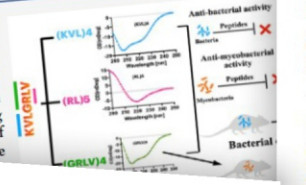
ABSTRACT: The quest for new approaches for generating novel bioactive designer proteins/peptides has continued with their success in various biomedical applications. Previously, we designed a 14-mer α-helical peptide with antimicrobial and antimycobacterial activities employing a tandem repeat of the 7-mer, "KVLGRLV" human
Herein, we devised a new method of "sliding
amino acid scaffolds of
a peptide



Contents lists available at ScienceDirect

Phytomedicine

journal homepage: www.elsevier.com/locate/phymed

Original Article

Androsin alleviates non-alcoholic fatty liver disease by activating autophagy and attenuating *de novo* lipogenesis

Abhinav Singh [1,b,c], Alisha Ansari [1,a,c], Jay Gupta [a], Himalaya Singh [b,c], Kumaravelu Jagavelu [b,c,*], Koneni V. Sashidhara [a,c,d,*]

[a] Medicinal and Process Chemistry Division, CSIR-Central Drug Research Institute, Jankipuram Extension, Sitapur Road, Lucknow 226031, India
[b] Pharmacology Division, CSIR-Central Drug Research Institute, Lucknow 226031, UP, India
[c] Academy of Scientific and Innovative Research (AcSIR), Ghaziabad 201002, U.P., India.
[d] Sophisticated Analytical Instrument Facility & Research, CSIR-Central Drug Research Institute, Jankipuram Extension, Sitapur Road, Lucknow 226031, U.P., India

ARTICLE INFO

Keywords:
Picrorhiza kurroa
Androsin
ApoE-/-
autophagy
de novo

ABSTRACT

Background: Non-alcoholic fatty liver disease
horizon. *Picrorhiza kurroa*

Journal of Medicinal Chemistry

pubs.acs.org/jmc

Article

Discovery of an Ortho-Substituted *N*-Cyclopropylmethyl-7α-phenyl-6,14-*endo*ethano-tetrahydronorthebaine Derivative as a Selective and Potent Kappa Opioid Receptor Agonist with Subsided Sedative Effect

Zixiang Li, Rufeng Ye, Qian He, Jiashuo Lu, Yanting Sun, Xiujian Sun, Siyuan Tang, Shuyang Hu, Jingrui Chai, Linghui Kong, Xiaoning Liu, Jing Chen, Yun Fang, Yingjie Lan, Qiong Xie, Jinggen Liu,* Liming Shao,* Wei Fu, Yujun Wang,* and Wei Li*

Cite This: J. Med. Chem. 2024, 67, 7112−7129

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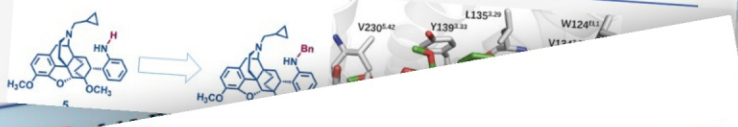

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Letter

p-TsOH-Mediated Intramolecular C2-Arylation on NH-Indoles: Access of 5,10-Dihydroindeno[1,2-*b*]indoles

Anurag Verma, Ruchir Kant, and Nayan Ghosh*

Cite This: Org. Lett. 2024, 26, 6814−6818

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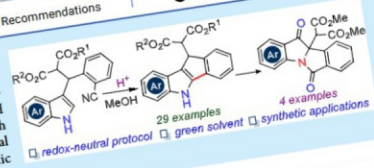
ABSTRACT: 5,10-Dihydroindeno[1,2-*b*]indole has served as an important starting precursor for BARAC-fluor reagent in medicinal chemistry. Herein, an unprecedented *p*-TsOH assisted intramolecular C2-arylation of NH-indoles via C(sp^2)-CN/C(sp^2)-H coupling, offering a series of 5,10-dihydroindeno[1,2-*b*]indoles with good to good yields, has been showcased under redox-neutral
Furthermore, successful scalability and synthetic
practical nature of the method.



Scheme 1. Overview of Previous and Present Works

Use of indeno[1,2-*b*]indole in bioorthogonal chemistry

extensively used in drug discovery research

Journal of Medicinal Chemistry

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Article

Corannulene Amino Acid-Derived Water-Soluble Amphiphilic Buckybowls as Broad-Spectrum Membrane Targeting Antibacterial Agents

Saroj Maji,[§] Sariyah Akhtar,[§] Sabyasachi Halder, Indranil Chatterjee, Devesh Pratap Verma, Neeraj Kumar Verma, Jyotshana Saroj, Deepanshi Saxena, Rahul Maitra, Juhi Sharma, Bhawana Sharma, Hidehiro Sakurai, Kalyan Mitra, Sidharth Chopra, Jimut Kanti Ghosh,* and Gautam Panda*

Cite This: J. Med. Chem. 2024, 67, 15041−15060

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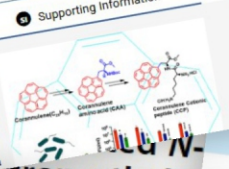
To date, the use of corannulene has been restricted in the area of material
application in biomedical research has yet to be established due to its
environment and synthetic infeasibility. Herein, we detail the
curved π-conjugated corannulene-containing
this challenge. These CAAs have
nulene-containing water-
broad-spectrum



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Anion-Relay Double Aza-Michael−Michael Cascades to Enone-Tethered Cyclohexadienones: Access to an Intricate Bridged Ring System

Anil Chauhan, Raj Kumar Patel, Akhilesh Yadav, Ruchir Kant, and Ravindra Kumar*

Cite This: Org. Lett. 2024, 26, 5602−5608

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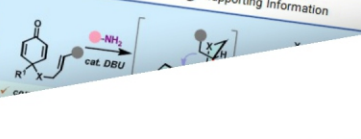
ABSTRACT: An anion-relay double aza-Michael−Michael addition strategy has been reported for the synthesis of intricate scaffolds from enone-tethered cyclohexadienones and primary amines. This method discloses the base-catalyzed synthesis of highly valued bridged aza-tricyclic frameworks with a high level of product selectivity and stereoselectivity. Gram scale synthesis and synthetic transformation were shown to afford structurally diverse bridged aza-polycyclic amines. Control experiments
mechanism.



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Letter

Polycyclic Pyrazoles from Alkynyl Cyclohexadienones and Nonstabilized Diazoalkanes via [3 + 2]-Cycloaddition/[1,5]-Sigmatropic Rearrangement/Aza-Michael Reaction Cascade

Raj Kumar Patel, Priyankar Jha, Anil Chauhan, Ruchir Kant, and Ravindra Kumar*

Cite This: Org. Lett. 2024, 26, 839−844

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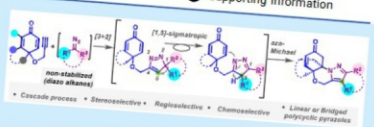
ABSTRACT: An efficient method for the stereoselective synthesis of "all center substituted" polycyclic pyrazoles from alkynyl cyclohexa-2,5-dienones and nonstabilized diazoalkanes via sequential [3 + 2]-cycloaddition/[1,5]-sigmatropic rearrangement and aza-Michael reactions is reported. The developed process is highly regioselective and stereoselective. It employs a wide substrate scope to furnish structurally diverse linear and bridged [4.4.*n*.0] ring-fused pyrazoles in moderate to good yields. One-pot and gram-scale syntheses and synthetic transformations have also been showcased.



Owing to the unique reactivity of diazo compounds, they have been served as versatile building blocks in chemical synthesis. In general, they are carbene-

along with associated challenges with respect to

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Letter

Enzyme-Catalyzed Regioselective Synthesis of 4-Hetero-Functionalized 1,5-Disubstituted 1,2,3-Triazoles

Navaneet Kumar* and Atul Kumar*

Cite This: Org. Lett. 2024, 26, 7514−7519

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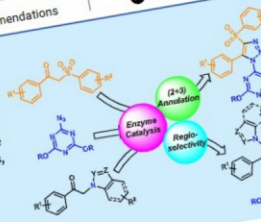
ABSTRACT: Enzyme-catalyzed novel protocols for the regioselective construction of fully substituted 1,2,3-triazoles by employing 2-azido-1,3,5-triazine (ADT) as a 1,3-dipole for the cycloaddition reaction with the activated alkene in an aqueous medium have been developed. Various 4-heterosubstituted-1,2,3-triazoles were readily assembled in good to excellent yields with high regioselectivity. This reaction also features wide substrate scope, strong functional group tolerance, gram-scale synthesis, and an environmentally friendly process.



chemistry, materials science, medicinal
discovery, and the pharmaceutical industry.

beneficial and

GLP Test Facilities for Pharmaceuticals

The GLP test facility of CSIR-CDRI is a dedicated facility meant for the development of pharmaceuticals for humans. This facility is certified by the NGCMA, Government of India. Since, October 2017, Regulatory safety pharmacology studies, mutagenicity, *in vitro* chromosomal aberration assay, *in vivo* micronucleus assay, systemic toxicity studies for different durations, and male fertility study as per the therapeutic need of the disease, and reproductive toxicity in males are under the ambit of the GLP studies in the facility. The safety pharmacology and regulatory toxicity studies are done at our center as per the requirement of the Drug Controller General of India, by following ICH and OECD guidelines. Currently, more than 132 studies have been conducted at the GLP Certified facility since the certification. We have successfully faced the surveillance audit by NGCMA on March 6 and 7th. The facility has one hundred seventy-two standard operating procedures. Thirteen study directors the 20 study personnel execute the GLP studies. The study reports have been submitted to the CADC for archiving for at least three cycles. Document controllers, archivists, animal facility, and engineers are supporting the smooth functioning of the GLP test facility. The following studies were conducted in this year:

1. Dhatri Lahua: 180 Days Repeat Dose Toxicity Study in SD Rats by Oral Route with Reversal.
2. S017-622: 7 Days Dose Range Finding (DRF) Toxicity Study in Rats by Oral Route. Non-GLP, 7-day DRF study.
3. Guduchi: Single Dose Toxicity Study in Swiss Mice by Oral Route.
4. Guduchi: Single Dose Toxicity Study in SD Rats by Oral Route.
5. Amalaki: Single Dose Toxicity Study in Swiss Mice by Oral Route.
6. Amalaki: Single Dose Toxicity Study in SD Rat by Oral Route.
7. S-019-0277: Single Dose Toxicity Study in Swiss Mice by Oral Route.
8. Vasa (*Justicia adhatoda* Linn.) Leaves Extract: Single Dose Toxicity Study in Swiss Mice by Oral Route.
9. Vasa (*Justicia adhatoda* Linn.) Leaves Extract: Single Dose Toxicity Study in Rat by Oral Route.
10. NMITLI-118 AF1: Cardiovascular Parameters Safety Pharmacology.
11. SB/CDRI4/105: Single Dose Toxicity Study in Swiss Mice by Subcutaneous Route.
12. SB/CDRI4/105: Single Dose Toxicity Study in SD Rat by Subcutaneous Route.
13. Dhatri Lauha: Evaluation of mutagenicity by Salmonella Reverse Mutation Assay (Ames test).
14. S011-1793: *In vitro* Chromosomal Aberration Test in Human Peripheral Blood Lymphocytes.
15. Dhatri Lauha: Evaluation of Genotoxicity by Micronucleus Test in Mouse Bone Marrow Cells.
16. Male Fertility study of Chebulinic Acid Enriched Fraction (CAEF) in SD Rats by Oral Route.
17. Guduchi: 28 Days Repeat Dose Toxicity Study in SD Rat by Oral Route with Reversal.
18. Chebulinic Acid Enriched Fraction (CAEF): Single Dose Toxicity Study in Swiss Mice by Oral Route.
19. 2 Amino-5-hydroxy hexanoic acid/ (5-hydroxy norleucine): Single Dose Acute Toxicity Study in Swiss Mice by Oral Route.

First Row (L to R): Ms. S. Mehzaben, Ms. Deepmala, Ms. Smriti, Ms. Neha Topno, Dr. Richa Pandey, Dr. Radha Rangarajan, Dr. Vineeta Tripathi, Dr. S K Rath, Dr. Sarika Singh, Dr. Jiaur R Gayen, Dr. Jayanta Sarkar, Er. Jai Prakash

Second Row (L to R): Dr. Baisakhi Moharana, Ms. Sachi Bharti, Dr. Manish K Chourasia, Dr. Aamir Nazir, Dr. Rajdeep Guha, Sheeba S Samuel, Mr. Narendra Kumar, Dr. Virendrakumar M Prajapati, Er. Santosh Shukla, Er. Brahma Singh, Dr. Prabhat R Mishra, Dr. Manoj K Barthwal, Dr. Durga Prasad Mishra

Third Row (L to R): Dr. Ashish Awasthi, Dr. Rabi Sankar Bhatta, Mr. Deepak, Mr. Abinash, Dr. Sachin Kumar, Er. Ranveer Singh, Mr. Anil Kumar, Dr. Aravind Singh Kshatri, Dr. Madhav N Mugale, Er. DK Vishwakarma, Er. Sidhoo Hembrom

DSIR Common Research and Technology Development Hub (CRTDH)

R&D Scale Formulations Manufacturing Facility, Drug Testing Lab (DTL), and Bioanalytical Facility for Preclinical and Clinical Pharmacokinetics

The DSIR-CRTDH has been established in CSIR-CDRI with budgetary support from DSIR and CSIR. Formally inaugurated on 21 February 2021, the CRTDH facility is functioning with the following broad objectives:

a) *Generation of chemical and pharmaceutical information on API and formulations physicochemical, analytical, and validation data.*

b) *Quality Assurance, Monograph, and Final/Batch Release Specifications including Stability Studies:* Real-time and accelerated, per Schedule Y and ICH Q1A(R2) through Q1E.

c) *In vitro pharmacokinetics and metabolism:* Solubility, pKa, logP and stability in simulated biological fluids, PAMPA/CaCo2 permeation, plasma stability, and protein binding, whole blood partitioning; Rat S9 and human microsomal stability, CYP regulation/reaction phenotyping using recombinant human CYPs.

d) *Preclinical pharmacokinetics, absorption, distribution, metabolism, and excretion:* PK, metabolite identification, and toxicokinetics in blood using rodents, other efficacy models, canines or non-human primates; bio-distribution, allometric scaling, PK modeling and population PK.

e) *Bioanalysis for clinical pharmacokinetics, including bioavailability and bioequivalence.* (Liaison with CSIR-CDRI's Clinical Pharmacology sites at KGMU, Lucknow; PGI, Chandigarh and KEM Hospital, Mumbai.)

GMP Production Capacity and Capability—Pilot/R&D to Phase II Clinical Trial Batches (including placebos) under Form 29 License or Form CT-10 Permission. Across the board: from conventional oral and topical formulations to transdermal systems, nasal and pulmonary drug delivery systems, liposomes and nanoparticle (Sterile products will be added in the next phase). It also has a Form 37-Licensed, GLP-certified facility for pharmaceutical analysis, impurity profiling, accelerated and real-time stability and photostability— almost all pharmacopoeial tests (except Schedule C and C1). The bioanalysis capacity for preclinical pharmacokinetics and pharmacodynamics is equipped with LC-MS/MS, HPLC, ELISA, microplate-based assays and nucleic acid tests. The CRTDH has provided technical and/or consultancy services to 41 pharmaceutical companies to date.

Quality-by-design approach to development of tablet formulations. Contour plot of weight variation with reference to proportion of MCC, DCP and Talc. The red region shows the compositions generating greatest weight variation, and blue shows the compositions where it is minimum.

CMC packages have been prepared for:

1. Centinhale,
2. S007-867,
3. S007-1500,
4. S011-1793,
5. S-016-1348,
6. SB-CDRI4-105,
7. GS/IICT 5/6,
8. S-016-1271.

First Row (L to R): Dr. Vivek Vidyadhar Bhosale, Dr. Kavita Singh, Mr. AS Kushwaha, Dr. Rabi Sankar Bhatta, Dr. Manish K Chourasia, Dr. Radha Rangarajan, Dr. Amit Misra, Dr. Prabhat Ranjan Mishra, Dr. Jiaur R Gayen, Ms. S. Mehzabeen, Dr. Varun Kushwaha
Second Row (L to R): Pragathi, J V U S Chakradhar, Sonia Verma, Deepak Sharma, Abinash Bharati, Divya, Naren, Dinesh Kumar, Sharif Raza Khan, Sweety Das, Shipra Singh, Shivam Rathore, Chunna Yadav
Third Row (L to R): Prabhat Mishra, Shivansh, Parag Varshney, Shovan Gosh, Rohit, Shiladitya, Shivi, Heerak, Santosh, Arpon, Sanjay, Abhijeet, Samiksha, Alabhyas

National Laboratory Animal Facility

The Laboratory Animal Facility (LAF) at CSIR-Central Drug Research Institute, Lucknow, also recognized as the National Laboratory Animal Center (NLAC), is a CCSEA-registered facility (Registration No. 34/GO/ReRcBiBt-S/ReRc-L/99 CPCSEA). It is monitored by the Institutional Animal Ethics Committee (IAEC) and is a certified GLP-compliant test facility (No. GLP/C-108/2017, DOI: 18.10.2017). LAF serves as a research and development support facility engaged in the breeding, production, and experimentation of small laboratory animals such as rodents (rats, mice, hamsters, gerbils, mastomys, guinea pigs) and rabbits. Additionally, the facility hosts a state-of-the-art non-human primate research and rehabilitation unit.

NLAC also acts as a national resource center, supplying healthy laboratory animals to CCSEA-registered research and academic institutions across India. Currently, the facility houses approximately 12,000 animals across eight species and more than 25 strains, including inbred, outbred, immunodeficient, and transgenic models.

Mandate

1. Breeding, production, and supply of high-quality laboratory animals for IAEC-approved in-house biomedical studies.
2. Supplying healthy animal models to CCSEA-approved private and government research/academic organizations.
3. Monitoring and maintaining animal health and quality through genetic, microbial, viral, pathological, and parasitological screening.
4. Providing scientific and technical consultancy for establishing laboratory animal facilities as per CCSEA guidelines.
5. Conducting human resource development programs including symposia, workshops, seminars, and hands-on training in laboratory animal care and management.
6. Publishing and disseminating literature on current issues in laboratory animal science and experimental practices.

Animal housing at NLAC during F/Y 2024-25

Sl. No	Species	Genotype	Opening stock (01.04.2024)	Closing stock (31.03.2025)
1	Mice	Outbred	2127	1796
		Inbred	6505	4635
		Inbred	869	869
2	Rat	Outbred	3307	2051
		Inbred	944	720
3	Hamster	Outbred	1350	531
4	Gerbil	Outbred	394	30
5	Mastomys	Outbred	296	547
7	Rabbit	Outbred	217	147
8	Monkey	Outbred	59	56
	Total		16068	11382

Animals issued to IAEC-approved in-house projects and supplies to other IAEC-approved-CCSEA registered institutions

Animal Species	No. of Animals supplied to CSIR-CDRI	No. of Animals supplied to external organizations
Mouse	11321	1936
Rat	5513	2044
Hamster	270	130
Mastomys	262	-
Gerbil	84	-
Rabbit	15	72
Total	**17465**	**4182**

First Row (L to R): Mr. S. Rajakumar, Dr. Virendra Kumar Prajapati, Dr. Chetan Meshram, Dr. Rajdeep Guha, Dr. Baisakhi Mohrana, Dr. Dhananjoy Hansda, Dr. Jayanta Sarkar, Dr. Zaheeb Rasheed Wani

Second Row (L to R): Mr. Surendra Kumar, Mr. Dinesh Kumar, Mr. Ravi K Shukla, Mr. Shailendra Mohan, Mr. Narender Kumar, Dr. Vijay K Verma, Mr. Sanjeev K Saxena, Mr. Chandra Shekhar Yadav

List of Institutions who had procured experimental animals from CSIR-CDRI Animal Facility

- NIPER, Raebareli
- SPS-CSJM, University, Kanpur
- JNU Medical College AMU, Aligarh
- ICAR-IVRI, Bareilly
- CSIR-NBRI, Lucknow
- Integral University, Lucknow
- KGMU, Lucknow
- ICMR-NARFBR, Hyderabad
- ICMR-RMRIMS, Patna
- University of Lucknow
- University of Allahabad, Prayagraj
- IIT, Kanpur
- Dr. RML Institute of Medical Sciences, Lucknow
- RGSC- BHU, Varanasi
- CSIR-IITR, Lucknow
- Era Medical college, Lucknow
- Amity University, Noida
- Regional Ayurveda Research Institute, Madhya Pradesh

Non-Human Primate (NHP) Experimentation

The primate facility is CCSEA-approved for studies involving regulatory toxicology, pharmacology, and screening of antimalarial compounds and vaccines. An eco-friendly NHP rehabilitation unit has been established to house NHPs post-experimentation, where they receive continuous veterinary care. The facility complies with GLP and international regulatory standards.

Status of animals in NHP facility

	Experimental	Rehabilitation	Quarantine	Total
Number of NHPs as on 01.04.2024	20	39	-	59
Number of NHPs as on 31.03.2025	19	37	03	56

Nonhuman primates maintained in the units were periodically examined physically and clinically for their physical and physiological well-being.

Health Monitoring of Laboratory Animals

Parasitological monitoring of animals

In rodents, ectoparasites such as mites and lice residing on the skin were detected through microscopic examination of hair samples and deep skin scrapings. For the detection of endoparasites or their eggs/ova, fecal samples were collected and examined microscopically using the direct smear technique. A total of over 1500 samples were analyzed for the presence of parasitic ova or live parasites.

Pathological monitoring of animals

Diseased or moribund animals from the breeding colonies exhibiting clinical symptoms were subjected to necropsy, and their gross pathological findings were documented. Representative tissue samples were collected and preserved for confirmatory histopathological examination. Over 200 samples were analyzed during this period.

Microbial monitoring of animals

Rodent and non-rodent animal colonies were regularly monitored for potential infections that could compromise biomedical research outcomes or adversely affect animal health. Bacterial load was assessed periodically in individual strains, and environmental monitoring including floor swabs and air samples was conducted in the GLP test facility in accordance with established SOPs.

Microbial screening of laboratory animals was performed at regular intervals to detect the presence of pathogenic microorganisms. The animals were routinely screened for the following microorganisms:

Virus	Method
Mouse Minute Virus (MVM)	ELISA
Mouse Hepatitis Virus (MHV)	ELISA
Mouse Sendai Virus (MSV)	ELISA
Mouse Mycoplasma Pulmonis (MMP)	ELISA
Mouse Lymphocytic Choriomeningitis Virus (MLCV)	ELISA
Mouse Parvovirus (MV)	ELISA
Rat Mycoplasma Pulmonis (RMP)	ELISA
Rat Parvovirus (RPV)	ELISA
Rat Coronavirus/ Sialoda Cryoadenitis Virus (RCV/SDA)	ELISA
SARS-CoV-2 in Hamster	ELISA
Bacteria	**Method**
Helicobacter pylori	Culture
Corynebacterium kutcheri	Culture
Streptococcus pneumoniae	Culture
Pasteurella multocida / P. pneumotropica	Culture
P. aeruginosa	Culture
Salmonella sp.	Culture
Klebsiella pneumoniae	Culture
Group B-Streptococci	Culture
S. aureus	Culture
Bordetella bronchiseptica	Culture

Genetic monitoring of animals

A panel of twenty Simple Sequence Length Polymorphism (SSLP) markers was utilized as a primary genetic screening tool to monitor the genetic integrity of commonly used inbred mouse strains, while a separate set of twenty markers was analyzed for rats. Genetic profiling confirmed the homozygosity of inbred strains and the expected heterozygosity of outbred strains maintained within the institutional animal facility.

Ethics in animal experimentation programmes of the institute

Institutional Animal Ethics Committee (IAEC) meetings were conducted as per requirement during the year 2024-2025. More than 200 fresh and ongoing animal research proposals were reviewed and approved. Based on IAEC recommendations, two proposals involving the use of rhesus monkeys were forwarded to the Committee for the Control and Supervision of Experiments on Animals (CCSEA) for further consideration.

Students of the institute were regularly trained on the ethical and justified use of animals in research, in alignment with the 3Rs principle—Replacement, Reduction, and Refinement.

Sophisticated Analytical Instrument Facility (SAIF)

Sophisticated Analytical Instrument Facility (SAIF)

Sophisticated Analytical Instrument Facility is under the roof of the SAIF&R division at CSIR-Central Drug Research Institute, Lucknow. It is a more than 49-year-old facility, jointly set up by the Department of Science & Technology (DST), Govt. of India, and CSIR-CDRI, Lucknow, in the mid-seventies (1974-75). At present, facility partially supported by the Department of Science & Technology (DST) to provide chemistry-centric analytical services (https://saiflucknow.org). On the other hand, electron microscopy and other analytical facilities are supported by the CSIR-CDRI, Lucknow. These facilities are accessible to both internal and external facility users and support major R&D activities of the institute. The services are used by about 75 internal and 350 external users annually. More than 90% of the external users comprise researchers from universities and colleges in India. Researchers from national laboratories and industries constitute the rest. Besides providing analytical services, facility scientist groups are also involved in the R&D activity of the institute, with several ongoing projects. The development of analytical methods, ultrastructural characterization using TEM/SEM, and structural characterization of new chemical entities are the core areas of research in the SAIF&R division. Students also work for their Ph.D. degrees utilizing modern analytical equipment in SAIF. Facilities available at SAIF, Lucknow:

- Mass spectrometry
- NMR spectroscopy
- Electron Microscopy
- Elemental analysis
- IR spectroscopy
- UV-Vis spectroscopy
- Chromatography (HPLC)
- Circular dichroism (CD)
- Polarimetry

Sophisticated Analytical Instrument service provided during the year are as follows:

Name of Facility	**No. of External Samples Analyzed**	**No. of Internal Samples Analyzed**	**No. of Total Samples Analyzed**
Mass Spectrometry	1105	19791	20896
NMR Spectroscopy	1119	30332	31451
Electron Microscopy	123	1020	1143
Other Analytical Facility	939	2436	3375
Total No. of Samples	**3286**	**53579**	**56865**

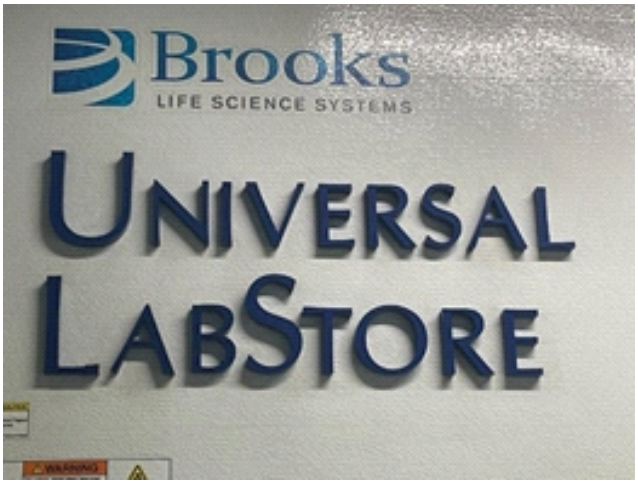
First Row (L to R): Dr. Sanjeev Kanojiya, Dr. D. K. Mishra, Dr. K. V. Sashidhara, Dr. Kalyan Mitra, Dr. Santosh Kumar

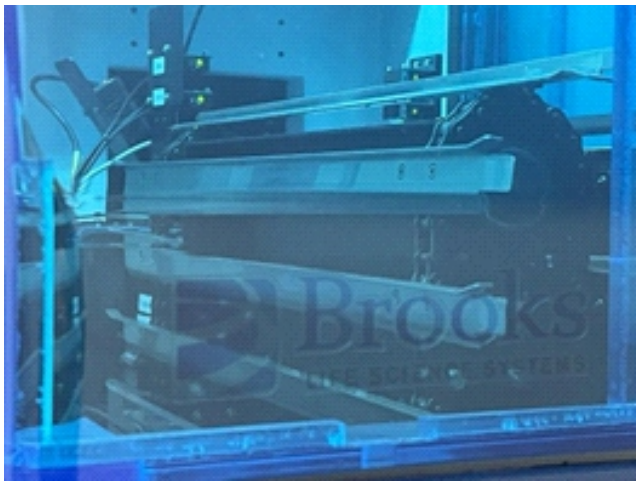
Second Row (L to R): Er. Manoj Kumar Rawat, Dr. Vineeta Tripathi, Dr. Vineeta Rai

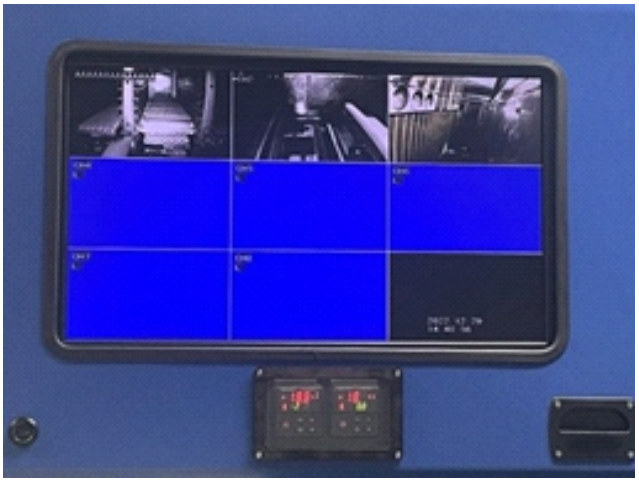
National Repository of Small Organic Compounds

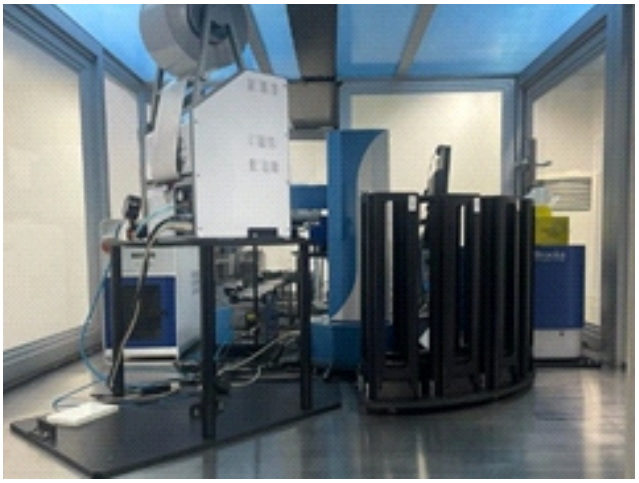
The new drug design and discovery is a highly challenging, cost-intensive, and time-consuming research effort. Still, the problem of resistance to the present treatments or improvement of the present treatments to alleviate human suffering from different diseases and provide affordable healthcare underscores the need to continually discover new drugs. With a better understanding of molecular biology, genetic layouts, biochemical pathways, and protein science, new drug discovery and development now follow the paradigm of a target-driven approach rather than a hypothesis-driven. The success of target-driven drug discovery relies on bioinformatics approaches which allow drug designers to visualize ligands bound to different targets providing a wealth of details concerning the non-bonded interactions that control the binding process and their implications. Various computational techniques including molecular docking, virtual screening, molecular simulations, and machine learning methods are employed to study the ligand-protein interactions and discover novel molecular entities with selective pharmacological activity. Such target-oriented approaches are commonly followed for discovering bioactive compounds for different lifestyle disorders and age-related diseases. Although the discovery process for parasitic diseases and microbial infections still relies on hypothesis-driven phenotypic screening or a random approach, a target-driven route in selected disease areas exists. Notably, the two distinct discovery approaches viz. hypothesis and target driven require a large pool of diverse chemical prototypes for *in silico*, biochemical or cell-based screening to identify hits. On the other hand, the paradigm of drug discovery via the repurposing of bioactive pursued globally also requires a large collection of compounds. In this context, this institute realized the importance of archiving the compounds which are produced in the medicinal and process chemistry division in state-of-the-art conditions. Thus, this institute purchased and installed the Automated Chemical Stores in 2012, which was commissioned in October 2013. Since commissioning all the compounds available with the institute were transferred and archived in the CDRI Repository. Simultaneously all the new compounds produced over the period are added to this archival facility and therefore the chemical library is progressive. In addition to the compounds being produced within the institute, the institute also acquired commercial chemical libraries of organic compounds and purely natural compounds to boost the efforts for identifying the leads. Presently the CDRI Repository comprises approximately 90,000 small organic compounds and 215 natural compounds. The Repository at this institute is equipped with state of an art Liquid Handling Platform that is effectively utilized for preparing stock solutions of compounds and their distribution for bioassays towards identifying bioactive under different disease areas being pursued at the institute. There is a battery of more than 30 primary screens which is often employed for the identification of hits. Needless to mention, SOPs and cut-offs for all bioassays as per the global standards are maintained. In order to maintain the proper record of all compounds being distributed and archived in the Repository, an Online Chemical and Biological Assay Reporting System popularly acronymed as CBRS was developed in-house by the Computer Division. This not only assists in archiving the spectral records and purity parameters of all compounds present in the repository but also allows to keep of a record of all assays together with the results of biological investigations any compound has undergone. In order to enhance the diversity of the chemical library, the institute welcomes recruiting compounds from all academic and research institutes and universities.

The team of Dr. Anil K. S. and Dr. Bhawana Sharma handles all the work related to the Repository. From receiving the sample in the Repository, assessing its purity, preparing the stock solutions, and distributing the solutions to biologists for bioassay and archiving are being executed by this team. It is imperative to mention that all biologists in the institute can request any compound from the collection for their bioassay.









The Automated Storage system from Brooks Automation (now Azenta Lifesciences) is equipped with options to store compounds in the 2.0 mL vial, 1.4 mL tube, or 96 well plate format at -20 °C under nitrogen. The Repository has the Biomek Liquid Handling Station for preparing the stock solution of compounds for distribution to biologists for performing assays. The Repository has Analytical and Semi-Preparative HPLC systems for assessing the purity of the received samples and purifying compounds if required. The Nephelometer is used for evaluating the solubility of the compounds as and when required.

From the period of 1st April 2024 to 31st March 2025, 1154 synthetic compounds, 17 pure natural products and 28 external compounds were physically received in the repository. The purity check of all compounds were carried out, solutions were prepared and distributed for biological screening. We also received 4177 compounds containing Protease Library and 550 compounds containing Glycolysis Library. Simultaneously the compounds (synthesized in house or from Maybridge library) which showed promise in the *in silico* screening were distributed to biologists against their requisitions for assessing the bioactivity in respective bioassays.

(L to R) Dr. Bhawana Sharma, Dr. Sanjay Batra and Dr. Anil Kumar K.S.

Medicinal Plant Herbarium Facility

The Medicinal Plant Herbarium of CSIR-CDRI (Acronym CDRI) is one of the Indian Herbaria, indexed in 'Index Herbariorum' (https://sweetgum.nybg.org/science/ih/) of the W&L Steere Herbarium, New York Botanical Garden, USA. The Herbarium harbours more than 30,000 specimens in 896 pigeon holes of custom designed compactors. The specimens belong to 3,117 medicinal plant species under 1,809 genera and 196 families of vascular plants. Work on digitization of this Herbarium was initiated in 2013 with the scanning of herbarium sheets, followed by the entering of their data in between 2017-2022. At present, nomenclature update of the plants and final data editing are under progress. During 2024-25, data of more than 5,900 herbarium sheets have been verified and edited, of which nomenclature update of 383 species and rectification of scientific names of more than 1480 concomitant specimens have been completed.

Students, scientists and faculties from different government and private institutes like NCBS (Bangalore); SSPS (Lucknow); JNV (Shrawasti, Gouriganj, Raebareli & Pipersand); AIP (Kanpur); DPS (Gomtinagar); SRGS (Bakshi ka Talab); SSCP (Lucknow); APS (Shahjahanpur) and BRDPG (Deoria) have visited the Herbarium during this period for different purposes.

(L to R): Dr. Vineeta Tripathi & Dr. D. K. Mishra

Herbarium facility at CSIR-CDRI

Knowledge Resource Centre

The Knowledge Resource Centre (KRC) of the Institute provides information support to the scientific staff, students of the laboratory and visitors using both archival print resources and contemporary digital resources. It is situated in a beautiful building measuring 8000 sq. feet (approx.), fully air-conditioned building located in the main campus of CSIR-Central Drug Research Institute.

The primary objective of Knowledge Resource Centre (KRC) is to support the research and educational programs of the Institute by providing physical and online access to information, consistent with the present and the anticipated educational and research functions of the Institute. In accordance with the objectives of the Institute, over the years, KRC has been developing a comprehensive collection of peer-reviewed scholarly literature useful for the research community of the Institute. The secondary objective is to serve as a resource centre for the scholars and scientific community of the country. Besides this to promote Hindi, KRC procures Hindi books as well literature of common interest.

Resource Type	Collection Size
Books	23185
Bound Volumes of Journals	75144
e-Journals (ONOS)	> 12000
Reference Books/ Serials	> 2863
CDRI Theses & Dissertations	1975
Hindi Books	> 1064

Knowledge Resource Centre is serving the mission and purpose of the Institute by providing the literary services with a collection of books, bound volumes of journals, thesis, annual reports of various scientific Institutions & many more e-version of resources. This facility is available to the entire scientists, technical staff, students and guests. Resources received on gratis and donations are also housed in the KRC.

Services

- **One Nation One Subscription:** KRC has registered CSIR-CDRI as an institutional member of the One Nation One Subscription (ONOS) program, which has become operational w.e.f. 01-01-2025 as a Government of India initiative. Under the scheme, resources published by the 30 international publishers accounting for more than 12000 titles of journals and books are available for access to the scientific community of the institute.
- **IRINS:** KRC maintains a portal https://cdri.irins.org. The portal facilitates to our scientific faculty members to collect, curate and showcase scholarly communication and provides an opportunity to create a scholarly network. The profiles of the scientists are managed by the Vidwan ID created on the Indian Research Information Network System (IRINS) portal.
- **Digital Library Access Zone:** Major resources available under the facility are **EndNote, Biorender, GraphPad Prism and SnapGene** etc.
- **Online Catalogue** (OPAC: http://172.16.0.44/ (Intranet) Online Public Access Catalogue (OPAC)): available for document search.
- **KRC Management** (through KOHA packages): The KRC/Library is fully computerized using Koha software for day-to-day operations. Web Online Public Access Catalogue (OPAC) is available on the Internet.
- **SciFinder:** This resource is widely used to locate most relevant literature of research areas of Chemistry Search for organic/ inorganic/ biological substances/ metals etc. Conduct comprehensive patent searching, assess novelty of idea/ scaffold and Search by Bio-sequences (peptides and nucleotides).
- **Major E-Resources Under ONOS**

  KRC facilitates access to the journals published by the following publishers through ONOS:

  - AAAS- Science
  - ACM Digital Library
  - American Chemical Society Journals
  - American Institute of Aeronautics and Astronautics (AIAA) Journals
  - American Institute of Physics Journals
  - American Mathematical Society Journals
  - American Physical Society - ALL
  - American Society for Microbiology Journals
  - Annual Reviews Journals
  - ASCE Journals Online
  - ASME Journals Online
  - Bentham Science Journals

(L to R): Mr. Pankaj Upreti, Dr. Anand P. Kulkarni, Mr. Ramesh Chandra Gupta

- BMJ Journals
- Cambridge University Press Journals
- Cold Spring Harbor Laboratory Press Journals
- Elsevier ScienceDirect Journals
- Emerald Publishing Journals
- ICE Publishing Journals
- IEEE Journals
- IndianJournals.com
- Institute of Physics Journals
- Lippincott Williams & Wilkins (Wolters Kluwer) Journals
- Oxford University Press Journals
- Project Muse
- Sage Publishing Journals
- SPIE Digital Library
- Springer Nature Journals
- Taylor and Francis Journals
- Thieme Journals
- Wiley Journals

- **Plagiarism Check and Similarity Reports Generation**

  Similarity reports generated with the help of anti-plagiarism tool i.e. **iThenticate** of appoximate 1005 number of thesis and publications.

- **Reference Management Tool**

  KRC is providing facility of **Endnote** software for management of references to its users.

- KRC provides different scientific software and tools like **BioRender** for drawing scientific images; **GraphPad Prism** for generating graphs and **SnapGene** for genetic engineering & DNA sequencing etc.

- **Grammar Checking Tool**

  KRC provides a facility of research writing tool, Grammarly, to the scientific community of the institute.

- **Patent information database Orbit**

  The facility of patent information can be accessed through **Orbit** database.

- **Web of Science**

  Access to this citation database was made available to the entire scientific community of the Institute.

- **Document Delivery Service**

  Provided 317 document delivery services from our print & archival and subscribed resources as and when requested by the user via email, fax etc.

- **Scientometric Analysis**

  Carried out citation analysis of publications of individual scientists and organization using scientometric tools such as Web of Science of Clarivate Analytics.

- **Reprographic Services**

  The CDRI KRC offers photocopying services to all its members, and this service is available to all faculty members and students on nominal charges.

- **Archiving/ Institutional Repositories**

  To provide better access to the recently published literature as pre-prints of publications and theses are archived using D-Space Software.

- **Reference Service**

  Reference service helps users to make full use of the resources available in the KRC. It guides the use of KRC resources and services, assists in accessing e-journals, e-books, databases, multimedia sources etc. KRC also maintains a collection of reference books consisting of encyclopedias, dictionaries, directories, technical reports, scientific reports, pharmacopoeia (s), current protocols, methods, and globes, etc.

- **Apprenticeship Training**

  During the year, we engaged three graduate apprentice trainees in the area of Library and Information Science through the Board of Apprenticeship Training, Kanpur and trained them in the functioning of various areas of the KRC.

- **Resource Orientation Programs**

  The KRC takes an active part in the orientation program to familiarize users with various resources and services available to them and also whenever a new product or service is introduced. During the year below mentioned orientation programs were organized.

Sl. No.	Topic	Resource	Date
01	Training Session on SciFinder	SciFinder	16-04-2024
02	Talk on InCites by Clarivate	Web of Science	13-06-2024
03	Training session on MyLoft	MyLoft	20-06-2024
04	Training session on Web of Sci ence: Introduction to the new user interface by Clarivate	Web of Science	01-08-2024
05	Live webinar on Successfully Navigating High-Quality Scientific Journals by Elsevier	Elsevier	18-10-2024
06	Online user training on Orbit Intelligence: by Questel	Patent	23-10-2024

Scientific Directorate

The Scientific Directorate is looking after three major portfolios Planning, Project Monitoring and Technical Information, apart from taking care of Institutional responsibilities like, Art, Photo and Videography, organization of events, etc.

Planning

Under the domain of planning activities, the division extended support for the following Institutional activities:

- Formulation of new Mission mode projects (combined cost of 18.7 Cr), Network project (5 Cr), Seed fund proposals (combined cost of 244 Cr). All the proposals were vetted and evaluated technically for further consideration by the competent authority.
- In-house projects management. Coordination of the entire process leading to the successful implementation of 26 In-house projects.
- Vetting of proposals being submitted to external funding agencies, including government agencies, industries, Institutes, etc. More than 70 project proposals were vetted and processed for approval by the competent authorities.
- Budgetary planning for the FY 2024-25 and Budget estimates for FY 2025-26 for Chemicals, Consumables, Capital, Library, Furniture & fittings.
- Procurement planning.
- Number of proposals submitted under different categories:
    - CSIR schemes (Mission, FBR, and Seed Fund): 13
    - In-House Projects: 52
    - Grant in Aid Proposals (DST, SERB, DBT & ICMR): 70
    - Industry Sponsored Projects: 01

(From L to R): Mr. Ravindranath S. Londhe, Mr. Abhinav Kumar Sharma, Dr. Shruthi R. Raju, Ms. Farha Khan, Mr. Ashok Kumar, Dr. Anand P. Kulkarni, Mr. Himanshu Upadhyay, Mr. Arbind Kumar

Project Monitoring Activities

Under the domain of Project Monitoring, the PME unit is carrying out following activities:

- Monitoring of procurements, expenditure of all ongoing projects (more than 250 projects).
- Processing of Indents with due diligence.
- Monthly report generation on budget and expenditure.
- Audit compliant records of all projects in softcopies and hardcopies (more than 250 numbers of project folders).
- Vetting expenditure statements and utilization certificates for more than 200 projects and processing for approval of the competent authorities.
- Digitized information management.
- Coordination with Audit.
- Coordination of Project Monitoring Meetings.
- Number of Projects Monitored:
    - CSIR Projects: 23
    - In-house: 45
    - Grant-in-Aid: 117
    - Sponsored: 13
    - Collaborative: 12

Institutional Publications and Reports

Scientific Directorate is engaged in preparation of various

Institutional reports and documents. During the reporting period, following publications and reports were brought out:

- Preparation and Publication of CSIR-CDRI Annual Report 2023-24.
- Providing inputs for Annual Reports of CSIR and DSIR for the FY 2023-24.
- Research Highlights and Executive Summary Document for Research Council meetings.
- Preparation of Monthly reports.
- Preparation of Quarterly Reports.
- Response to Queries from Various Corners (Govt./non-Govt. agencies).
- Replies to Parliament Queries.
- Communication Within and Outside the Institute.
- Management of Database on Projects, Staff, Budget, ECF, Awards, etc.
- Brochures, Invitation Cards, Advertisements, etc.

Institutional Photography and Design Work

Scientific Directorate is the core of institutional art, videography and photography work. During the year, following activities were undertaken:

- Making video films of staff who superannuated during the year.
- Scientific Digital Photography for all publications, Scientific Journals and Research papers.
- Designing of CSIR-CDRI Advertisements.
- Photography Coverage of All Institutional Events namely, seminars, symposiums, agreements, conferences, lectures, farewells, colloquiums, and many such events.
- Designing of Institute Publications including Invitation Cards, Posters, Banners, Certificate, Brochures, Mementos.
- Allied Services under Photography and Designing like Poster designing for conferences, computerized graphic diagrams, drawings and charts, editing and processing of digital images for publications, etc.
- Maintenance and Update of Central Institutional Digital Photo Repository.

Business Development & Intellectual Property Unit

Business Development & Intellectual Property Group aims to establish stronger linkages between the Institute and Industry and academic institutions. The overall objectives are:

- To promote the technologies developed at CSIR-CDRI and facilitate the R&D divisions of CSIR-CDRI to have a better interaction with industries to develop novel technologies.
- Representing CSIR-CDRI in the exhibitions and expo to exhibit accomplishments of the Institute and opportunities available for industry, academia and society to collaborate with CSIR CDRI.
- Management of Intellectual Property Rights of the Institute. Liaisoning with CSIR. sister CSIR laboratories, National Biodiversity Authorities, other Government agencies.
- Conducting IP awareness programs.
- Coordination of the International S&T Affairs activities at CSIR CDRI including foreigners visiting the institute and deputation of staff to foreign countries.
- Carrying out biological activity studies of compounds against various diseases as requested by Academia and Industry sources.
- Active participation towards Translation of Research outcomes.

During the reporting period, the Business Development group continued to explore business development opportunities by establishing liaisons with national and international organizations and industries in order to have more public-private partnerships at an early stage of the development and to have collaborations for new leads. Several new contracts/assignments were signed/ undertaken by the Institute during the reporting period.

Number of Agreements/MoU Signed:

Sl. No.	Nature	Numbers
1.	Licensing of Technology	2
2.	Demonstration of Technology (Know-how)	1
3.	Collaborative Research Agreement	2
4.	Sponsored Agreement	5
5.	Consultancy	1
6.	Memorandum of Understanding signed for joint R&D	19
7.	Co-Ownership and Commercialization Agreement	1
8.	CSR Agreement	1
9.	Amendment of Clinical Trial Agreement	1
10.	Confidential Disclosure Agreement	13
11.	Termination Agreement	1
12.	Memorandum of Agreement	3
13.	IP Expense Sharing Agreement	1
14.	Amendment to the Cooperation Agreement	1
15.	Material Transfer Agreement	13

First Row (L to R): Dr. Kaushik Bhattacharjee, Dr. Naseem Ahmed Siddiqui, Dr. Suresh Kumar Battina

Second Row (L to R): Ms. Shraddha Jain, Ms. Neelima Srivastava, Mr. Sawan Kumar, Mr. Jai Prakash Dwivedi

Human Resource Development Group

Human Resource Development (HRD) is a framework for development of skills, knowledge, and abilities. Accordingly, HRD group of CSIR-CDRI is making efforts to nurture the skills to acquire capabilities required to perform various functions relating to present and future roles of students as well as employees. The composition of CDRI's HRD group includes, (i) Academic Affairs Unit, (ii) Placement and Alumni Cell, (iii) SSR Activities under Jigyasa (HCP0101), (iv) Deputation Abroad/International Trainings, (v) Skill Development Program (NWP0100)-PG Training Unit, (vi) Continuing Education programs, Awards, Recognitions, Fellowship, Conference, Symposia and Workshop for staff members and (vii) Student Hostel.

(i) Academic Affairs Unit

Coordination of the academic activities related to PhD programs of Academy of Scientific and Innovative Research (AcSIR), Ghaziabad and Jawaharlal Nehru University (JNU), New Delhi starting from admission, organization of course works, seminars, comprehensive, Research/Doctoral Advisory Committee (RAC/DAC) Meetings to Thesis submission, Viva-voce examination and finally award of Doctoral Degree.

Academic Related Activities

- Coordination of admission process of PhD positions in reporting period under CSIR-CDRI PhD Program (JNU & AcSIR).
- Coordination of Pre-PhD Course word of CSIR-CDRI PhD Programs.
- Orientation program for students registered in AcSIR/JNU.
- Coordination with Doctoral/Research Advisory Committee (DAC/RAC) for CSIR-CDRI PhD Programs along with all the documents related to thesis & viva voce, scanned & send to JNU and AcSIR.
- Coordination for conducting *Viva-voce* Examination.
- Issue of transcripts, certificates and verifications thereof.
- Formalities regarding other financial remittance to JNU/AcSIR according to commitments.
- Coordination and organization of Academic Council (Institutional, JNU & AcSIR)/JNU Scrutiny Committee Meetings.
- Initiative taken towards connecting stakeholders (Research /Academic Institutes /University /Medical Colleges) for enriching the academic environment and knowledge sharing.
- Organized Shodharambh: Induction Ceremony for newly joined research scholars at CSIR-CDRI.
- Initiated AcSIR Student Science Club and ACS International Student Chapter: To enhance student engagement and promote science communication within CSIR-CDRI, the AcSIR Science Club and the ACS International Student Chapter were established. These student-led bodies organized several initiatives during the year.
- Under the Green Initiative of the Institute, in Student corner, every newly joined research scholar planted a sapling in the Student Corner.
- In January 2025, Director, Dr. Radha Rangarajan, inaugurated the Student Corner, a space to relax and be yourself, in the presence of all faculty members and Newly joined research fellows.

First Row (L to R): Dr. Naseem A Siddiqui, Dr. D. K. Mishra, Dr. Ajay Kumar Srivastava, Dr. Vineeta Tripathi, Dr. Shruthi R Raju, Dr. Ritu Trivedi, Dr. SK Rath, Dr. Anand P Kulkarni, Dr. Sanjeev Yadav, Dr. PR Mishra, Dr. Rajdeep Guha, Ms. Neelima Srivastava, Ms. Farha Khan

Second Row (L to R): Mr. Ravindranath S Londhe, Dr. Anil Gaikwad, Mr. JP Dwivedi, Dr. Madhav Mughale, Dr. Kaushik Bhattacharya, Dr. K.V. Sashidhara, Mr. Susheel Kumar, Mr. Ashok Kumar, Dr. Kalyan Mitra, Dr. Sanjeev Kanojiya, Dr. Anil K S, Ms. Shraddha Jain

Interaction with Industry and students

Human Resource Related Activities

- Processing of applications for attending the conference /seminar /workshop/ symposium.
- Processing of applications for SRF, RA and Women Scientists to various agencies.

(ii) Science Communication and Dissemination Activities

- Science Communication and Dissemination through Vigyan Prasar & SCDD, CSIR-HQ.
- Science Communication and Dissemination through Print and Electronic Media.
- Science Communication and Dissemination through Social Media (Twitter & Facebook and LinkedIn).
- Activities under the aegis of Scientific Social Responsibility (SSR) of the Institute.
- CSIR-800 Program (Health Awareness and Outreach Projects by PhD students).
- Other Societal programs.

(iii) Placement Cell

The placement cell has been created to facilitate the job opportunities for the Ph.D. scholars who wish to pursue their carrier in Industries.

The cell carries out two activities viz. (I) Collating the data related to the PhD scholars, including their PhD duration date of thesis submission and *Viva-voce,* thesis title, publication and contact details, to facilitate placement assistance and networking opportunities and (II) Sharing job opportunities relevant to the PhD scholars in the placement WhatsApp group.

During the reporting period the placement cell organized walk in Interview with 4Health LLP, Ahmedabad for placement cell of CDRI students and also conducted one to one orientation session with students about how to prepare yourself for Industry Interviews.

The placement cell is actively looking to organise campus placement program with more industries in near future.

(iv) Alumni Cell

- Maintaining a database of alumni contact information and career updates to facilitate communication and networking opportunities.
- Connecting all alumni through a WhatsApp platform to facilitate ongoing communication, networking, and collaboration.
- Recognizing and celebrating alumni achievements and milestones through awards, accolades, and alumni spotlights.
- Serving as a liaison between alumni and the university administration, faculty, and students to facilitate communication, collaboration, and mutual support.
- Initiated "CDRI Alumni Talks Series" and highlighted the distinguished Alumnus under the hashtags #OurAlumniOurPride and #MeetOurAlumni on our social media handles.
- A special session was organized for Alumni during CTDDR2025.

(v) Skill Development Program (Healthcare & Life Science)

The **Skill Development Program** at CSIR-Central Drug Research Institute, Lucknow, is a pioneering initiative aimed at equipping India's youth with the practical skills and exposure needed to thrive in a rapidly evolving professional landscape. In a world where knowledge alone is no longer sufficient, this program bridges the gap between education and employability by offering experiential learning across critical domains in healthcare and life sciences.

In the 2024–2025 cycle, the program engaged **279 participants** through **13 specialized training modules**, demonstrating significant outreach and diversity. A strong emphasis on inclusivity was evident:

Information Technology Services

Information Technology Services

A) Software Development/Maintenance: Computer Center has developed, implemented and maintained the following software systems during the reporting period:

- CDRI Website and Intranet.
- Compound Submission and Bio-Assay Reporting (CBRS) System and its enhancement for natural compounds.
- Dispensary Automation Software, Human Resource Management Software System for Students.
- Management of latest DSPACE Software.
- Upgradation of Instrument Online Pre-booking System.
- Laboratory Animal Issue Software.
- Management & hosting of https://plantmetabolome.cdri.res.in Plant Metabolites Database and Tandem Mass Spectrum https://tmsdatabase.cdri.res.in Database.
- Online Portal for Technician & Technical Assistant Recruitment.
- Online Portal for Driver Recruitment.
- Online Portal for Scientist Recruitment.
- Online Portal for JSA & Jr. Stenographer Recruitment.
- Online Portal for IICB Recruitment.
- Online Portal for Job Card/ Ticket Management System.
- Online Budget Monitoring System.
- Online Electrical/Civil/Refrigeration/Other Lab Services Job cards.
- Online Gate Pass Application for Visitors.
- Online Request/Reporting for Small Molecule X-ray Diffraction Facility.
- Online Skill Development Program (SDP) registration for CSIR-CDRI Courses.
- Requisition for Bio-evaluation of compounds from CDRI Repository.
- Software for applications for recruitment of Project Assistant posts.
- Software for Wireless Controller log.
- Upgradation of Store & Purchase Software for goods and services procurement management as per new purchase procedure.
- Migration of Old SnP (Store and Purchase Software) from Java to .NET technologies.
- Online Portal for Bill Melinda Gates Foundation (BMGF) data management system.
- Online Portal for Translational Research TRG data management system.
- Online portal for CTDDR-2025.
- Management of Face based attendance system for Students using Python and MS SQL database.
- Application for display and printing of Salary slip.
- Development of new CSIR-CDRI website.
- Development of new intranet (Under development).
- Co-operative Society Database.
- Database for GPF Statement.
- New Online Portal for Digital Herbarium (Under Development).
- Online Portal for Asset DB Data Upload.

ICT Infrastructure Management and Services

- Operation and Management of LAN/WAN System comprising of 1500 wired nodes and campus-wide Wireless network and NKN link of 1 Gbps bandwidth.
- Operation and Management of servers and Storage systems.
- Comprehensive IT support to institute-wide users comprising approximately 1000 clients.
- Web hosting services for several publicly accessible websites including the institute's internet website (www.cdri.res.in).
- Support provided for the implementation of the e-procurement System.
- Provisioning for NIC e-mail services.
- Maintenance of PCs as per Standard Operation. Procedure(SOP) for Protection and validation of Hardware and Software under GLP.
- Routine backup for GLP-related data and management of GLP IT infrastructure.
- Hosting of CDRI tenders, advertisements, events etc on the website Portal.
- Online meeting platform facilities.
- ICT support for the adoption of e-office, E-HRMS AEBAS attendance and GeM portal.
- Secondary NKN link using NKN link of AKTU and extended similar redundancy to AKTU.
- Helped in implementation of NCCC Server and Firewall at CSIR-CDRI in support with CERT-In and CDAC for security of Institutional LAN.

(From L to R): Er. Ajay Kumar Maurya, Er. Santosh Shukla, Er. Rati Kumari, Er. Kural, Er. Mohammad Zubair Nizami

Centralized Utility Services

Centralized Utility Services

Environmental Health and Safety (EHS) remains a critical focus within research laboratories. At CSIR-CDRI, stringent compliance is upheld with the directives of statutory and government bodies, including the Ministry of Environment & Forests, UP Pollution Control Board, and Good Laboratory Practices (GLP) adhere to meticulous monitoring of experimental and environmental parameters. The centralized utility facilities at CSIR-CDRI play a pivotal role in supporting research and development (R&D) activities. These facilities encompass onsite liquid nitrogen generation and the operation and maintenance of centralized gas supplies such as LPG, Nitrogen, Compressed Air, Vacuum, and Pharmaceutical-grade Millipore Water, All Essential for Chemical and Biological Laboratory Operations. Additionally, the Centralized Utility Services (CUS) contributes significantly to waste management initiatives, including the operation and oversight of the Effluent Treatment Plant (ETP), mechanical shredder, and bio-compost machine. By consolidating these services, CSIR-CDRI ensures cost efficiency by reducing recurring expenses and maintenance costs, while maintaining high-quality standards at centralized points. Currently, these services are fully functional and effectively managed under the Institute Centralized Utility Services at CSIR-CDRI, Lucknow.

Centralized Gas Supply/ Utility services

1. Provision of nitrogen gas across all laboratories through a nitrogen generation unit, catering to 120 laboratories and 600 workbench points.
2. Facilitating the operation and regular maintenance of LPG, compressed air, and vacuum supply networks in all workbench areas within R&D facilities.
3. Providing and maintaining ASTM D1193 Grade-III deionized water for laboratories, ice machines, chillers and autoclave and various R&D equipment.
4. Maintenance and operation of MilliQ-grade water system, conforming to ASTM Grade-1 specifications with 18.2 resistivity.
5. Onsite operation of the Sterling LN2 unit, producing liquid nitrogen with a capacity of 10 LPH.
6. In the capacity of Nodal Officer for the Eco-Campus Initiative, led efforts to improve campus environmental practices, oversee waste management, and promote resident awareness as part of "Swachhta Pakhwada," while ensuring monthly updates were submitted to CSIR Headquarters.
7. Monitoring the environmental Health and safety compliances of GLP environmental parameters and compliances of SOP's.
8. Facilitating student interactions from various schools and colleges, showcasing the facility for natural plant extraction and drug development from medicinal plants.
9. Formulating and ensuring compliance with standard operating protocols for technical services under CUS's supervision and monitoring.

Environmental, Health & Safety Services

1. Execution of housekeeping service guidelines, including specialized cleaning for animal care labs and environmental management, aligned with Biomedical Waste Management Rules and Good Laboratory Practices (GLP) standards.
2. Managing the maintenance and operation of the bio-compost machine and a conveyor-supported mechanical shredder for efficient recycling of kitchen and horticultural waste produced on campus.
3. Overseeing the functioning and servicing of the Effluent Treatment Plant (ETP) to treat waste from labs prior to its transfer to the Sewage Treatment Plant (STP).

(From L to R): Er. Ranvir Singh, Dr. Sanjay Batra, Mr. Shiv Ram Mishra

4. Comprehensive pest control services, covering rodent elimination, mosquito fogging, termite eradication, and insecticide applications.
5. Ensuring functionality and maintenance of fire alarms, fire-fighting systems, fire hydrants, public address systems, and safety stations.
6. Managing the cleaning and servicing of drinking water purification units, along with general maintenance of shared spaces.
7. Facilitating the disposal of waste solvents for recycling/reuse.
8. Undertaking a plantation drive as part of "Ek Ped Maa Ke Naam," combined with lawn preparation and space optimization following the disposal of waste materials.
9. Designated as the Nodal Officer, CSIR-CDRI for the CSIR HQ-constituted team on the policy for the Disaster Management Program.
10. Coordinating lab tours for visitors and signatories, delivering talks on lab safety and environmental health, Bio techniques & Instrumentation, Fermentation, Research Methodology and Biomedical Waste Management Rules.

Liquid Nitrogen Generation Plant

Instrumentation, Common Equipment and Facility Management Unit

GLP facility & NABL facility at our institute are being used for externally funded and In-house GLP studies. These facilities accreditation have been given by NGCMA, DST, New Delhi and NABL Gurugram, Haryana after Audit. These agencies also carry out periodic audit of our GLP & NABL facilities. Instrumentation unit is responsible to establish & maintain the Equipment and Lab Environment Conditions as per OECD & ISO standard.

1) Management of Good Laboratory Practice (GLP) Facility

Instrumentation unit maintaining the Institutional GLP Facility as per the OECD Guidelines to comply the statutory requirements of NGCMA, DST-New Delhi. For that, the Instrumentation unit has been carried out following activities during last year:

- Technical specification preparation, verification, installation and commissioning of new GLP instrument.
- Calibration/validation of 113 nos. of GLP equipment as per OECD guidelines.
- Performance check/preventive maintenance and report preparation of 62 nos. of GLP equipment on quarterly basis.
- Environmental conditions (Lux, Sound Level, Relative Humidity and Temperature) monitoring & control in experimental rooms, TICO, CADC, Geno-toxicology & Histopathology lab and generate monthly analyzed RH-Temp. data reports for each GLP study.
- Daily monitoring of negative differential pressure in all experimental rooms.
- Updated and Implemented Standard Operating Procedure (SOP) of 7 nos. related to GLP equipment and environmental parameters control.
- Preparing and tagging the unique identification tag to all GLP equipment (134 Nos).
- Updating log books of GLP equipment with calibration certificate and other relevant details.
- Troubleshooting/repair of sophisticated GLP equipment.
- Providing training to user on GLP equipment use and performance check.
- Updating and maintaining following controlled GLP documents:
  - Mater equipment List (127 Nos. of GLP equipment)
  - Calibration/Validation record (113 Nos. of GLP equipment)
  - Minor equipment List (7 Nos. of GLP equipment)
  - Withdrawn/Replaced equipment list (30 Nos. of GLP equipment)
  - Unique Identity Tag (134 Nos. of GLP equipment)
- Total 19 nos. of GLP study has been completed during last year and provided analyzed environmental parameters reports for each study to study director also maintained the environmental parameters in experimental rooms and instruments for experiments.

2) Management of NABL (Basic Composite Medical Laboratory) Facility

SAIF Division implementing and maintaining NABL, QCI India guidelines for lab equipment and lab environment to maintain NABL accreditation for Basic Composite Medical Laboratory.

- Technical specification preparation, verification, Installation & Commissioning of new NABL Lab equipment.
- Calibration of equipment (10 nos.) as per NABL guidelines.
- Monitoring & maintaining the lab environment conditions (Relative Humidity & Temperature) and preparing monthly environmental reports of analysed data.
- Conducting quarterly preventive maintenance/ performance check of NABL equipment (10 nos.) and report prepration.
- Economical repair and maintenance of sophisticated NABL equipment.
- Prepared following controlled NABL documents.
- Standard Operating Procedure (SOP) related to NABL equipment and environmental parameters control (2 nos.).
- Mater equipment/Calibration List (14 Nos. of NABL equipment).
- Unique Identity Tag (14 Nos. of equipment).

3) Management of Instruments

Instrumentation unit provides efficient and economical repair, maintenance and upkeep of different sophisticated Analytical, Biomedical, Electronics and Laboratory equipment to all labs of CSIR-CDRI. Due to non-availability of imported components/spares, indigenous substitute were used to ensure the smooth functioning of equipment.

- Technical specification verification were carried out for the procurement of state of the art new equipment.
- Unit helped the user scientists to prepare broad based technical specification and to choose right equipment to suit their application.
- To identify the instruments either for their retention or disposal off.

(From L to R): Er. Sanjay Kumar, Er. Manoj Kumar Rawat, Dr. K. V. Sashidhara, Dr. Santosh Kumar, Er. Ram Karan Harijan

Instrumentation unit carried out special drive for instrument safety audit in different labs of the Institute, Director, CSIR-CDRI constituted Instrument Safety Audit committee (Er. Manoj Kr. Rawat, Chairperson, Er. Sanjay Kumar, Er. Jeevan Pandey and Er. K. B. Thapa). The committee completed instrument safety audit of about 50 nos. of different labs.

Instrumentation section (Er. Manoj Kr. Rawat and Er. Sanjay Kumar) carried out special drive for inspection and repair of Desktop UPS as Directed by Director CSIR-CDRI. About 75 nos. of UPS has been checked and changed the defective batteries and made UPS functional.

4) Facility Management:

As common facility management coordinating maintenance/repair of drinking water purification systems (27 nos.) installed at common places and other common facility of the Institute.

5) Auditorium Complex Management:

The Auditorium Management Unit under the Scientific Directorate looks after the audio-visual and related facilities of the auditorium and meeting rooms/halls for institutional scientific lectures, conferences, seminars, workshops, project meetings, selection committee meetings, RC meetings, Virtual Video Conferencing, and other general events.

The major activities of this unit are:

- Operation and maintenance of high-end audio and visual systems to ensure smooth functioning during events.
- Operation and Management of the Auditorium Complex.
- Coordination with other facilities/sections for smooth organization of events.
- Preventive maintenance of display systems, projectors, video switchers, streamers, amplifier switchers, feedback suppressers, microphones, portable sound systems, speakers, and projection systems.
- Upgradation of the audio and visual system to make it compatible with available latest technology.
- Virtual Conferencing through Skype, MS Team, Zoom, Google Meet etc.
- Live Broadcast Facility for Social Media websites like YouTube, Facebook, & Local LAN.
- ICT Support for Seminars, Symposium, and Virtual Conference meetings.
- Audiovisual support for Online Interviews, Assessments, and Recruitments.

(From L to R): Dr. Satosh Kumar & Mr. Sumit Khichi

Engineering Services

The Laboratory Engineering Services Division of CSIR-CDRI comprises three sections - Civil, Electrical, and Refrigeration & Air-conditioning. The division's primary objective is to maintain the existing infrastructure and develop new facilities. CSIR-CDRI has four campuses which are detailed below. Section wise Annual Report follows:

1. CSIR-CDRI new campus is spread in an area of 248395.56 Sqm. The campus comprises of Six numbers of R&D blocks (144 Labs), Animal house (Experimenting unit), Library building, Administrative block, Purchase & Engineering services building, Reception building, Electric Substation, A.C. Plant and Pump House. In addition to this campus also house Guest house, boys and girls hostel for research students, Staff Quarters, Club, Dispensary, Cafeteria, Gym, Crèche and Bank etc. Most of the campus buildings are 12-year-old.
2. CSIR-CDRI old campus is spread in an area of 22784.72 Sqm. The campus comprises of mostly breeding units of different animals along with supporting infrastructure. Most of the campus buildings are 72-year-old.
3. CSIR-Scientist Apartment, Aliganj, Lucknow campus is spread in an area of 42219.00 Sqm. The campus comprises of mostly transit accommodation for staff and students including Guest House in the heart of the city. Most of the campus buildings are 35-year-old.
4. CSIR-Dispensary, Nirala Nagar, Lucknow campus is spread in an area of 1513.12 Sqm. The campus provides basic medical facility to the staff and pensioners of the CSIR labs of the Lucknow and situated in the heart of the city. Most of the campus buildings are 42-year-old.

CIVIL SECTION

The maintenance, renovation and new works for the buildings of above campuses are being carried out by this Section. During the year 2024-25, following works had been carried out and detailed below:

1. Annual rate contract of the Institute area during 2024-25 at new campus beside various routine maintenance works, revamping of cafeteria, revamping of Guest houses at new CDRI campus & CSIR-Scientist Apartment, Aliganj, making the shredding and composting facility at ETP area had been done.
2. Making functional the sensor operated urinals of the new CDRI institute area all the 119 numbers sensor operated urinals of the new CDRI institute area had been overhauled and made fully functional.
3. Livening of campus first floor hall of cafeteria at new campus developed in the Livening of campus concept for the availability of quality canteen services during office hours as well as in beyond-office hours and on holidays too.
4. Floor repairing of all 36 service corridors Repairing of floors of all 36 service corridors to check the seepage problems by non-destructive alternate by departmental workforce had been done successfully.
5. Repair and painting of all fungal effected 36 service corridors and 35 labs.
6. Repairing and painting of all 36 service corridors and 35 labs of the institute to check the fungal growth had been completed successfully.

7. Repair of loosened stone claddings in most vulnerable areas of the institute repairing of loosened stone claddings in most vulnerable areas of the institute area had been completed successfully.
8. Making the occasions a great success ESD-Civil Section as a team made tremendous efforts to make the occasions like Annual Day, CSIR foundation Day, R.C. Meeting, CTDDR, visit of the Deputy Chief Minister of UP state and DG-CSIR a great success.

Electrical Section & Refrigeration Section

The Electrical Section & Refrigeration Section is responsible for maintaining, renovating and construction work for all campus of the Institute. There is list of the Major works under taken by these section in the year 2024-25:

1. Installation & commissioning of pressure independent control valves in the R&D building of the Institute and replacement of one cooling tower to improve energy efficiency of the HVAC system.
2. Execution of additional Solar Photo Voltaic (SPV) power generation plant capacity of 800 KWp under RESCO model.
3. GLP Facility - The environmental parameter and power supply of the facility were maintained round o'clock 24hrsx365 days as per OECD guidelines.
4. Installation of LED lights and BLDC fan to achieve energy efficiency.
5. Execution of various operation & maintenance contracts to up keep the electrical and refrigeration & air conditioning infrastructure of the institute 24hrsx 365 days.
6. Preparation of preliminary estimate for the new state of the art animal facility ACLAS.
7. Execution of contracts for operation & up keeping of Sewer treatment plant and Pump house of the institute and maintain zero water discharge policy.

Section IV

Events and Other Activities









1. Events Organized

1.1. 74th Annual Day Celebrations, 17 February 2025

Institute celebrated its 74th Annual Day, marking a legacy of excellence in pioneering drug research and development in India. During the event, Professor Sandhya S. Visweswariah, Honorary Professor and National Science Chair at the Indian Institute of Science, Bangalore delivered oration. The event was graced by Mr. G.V. Prasad, Co-Chairman & Managing Director of Dr. Reddy's Laboratories Ltd., as the Chief Guest. Notably, this milestone celebration heralds CSIR-CDRI's entry into its Platinum Jubilee Year, reinforcing its commitment to innovation and global scientific leadership.

Dr. Radha Rangarajan, Director presented the Annual Day report of the Institute and congratulated the research teams for outstanding accomplishments in terms of fundamental research, technologies, innovations and human resource development. The staff who have completed 25 years of service and superannuated staff during the year were felicitated by the digitaries.

As a part of the annual day celebrations, the Staff Club had organized Annual Sports activities for all the staff, students and family members towards creating team spirit. Winners of the sports activities were felicitated. The celebration concluded with a great traditional and modern cultural performances by the students.

1.2. 83rd CSIR Foundation Day and Open Day Celebration at CSIR-CDRI, Lucknow, 26-27 September 2024

CSIR Foundation Day, celebrated annually on September 26th, and observed as an "Open Day" across all CSIR laboratories. On this day, students and educators from schools and colleges are invited to tour the institutes, providing them with a first-hand experience of the scientific breakthroughs and ongoing research. This year, CSIR-CDRI welcomed around 750 enthusiastic students and educators from 18 schools and colleges who actively participated in a variety of engaging and educational activities aimed at inspiring the next generation of scientists and researchers.

Scientists and research scholars of CDRI organized a scientific exhibition highlighting the institute's major achievements, and a video showcasing CSIR-CDRI's accomplishments was displayed in the auditorium. School students also participated in a range of competitions, including theme-based science projects, quizzes, and extempore competitions, while they toured the laboratory and interacted with scientists.

During the event, the CSIR-CDRI staff members superannuated during the year were felicitated by the Director.

1.3. 78th Independence Day Celebrations, 15 August 2024

CSIR-CDRI celebrated the 78th Independence Day with vigor. Dr. Radha Rangarajan, Director hoisted the national flag followed by the national anthem. The Director addressed all the staff, students, family members and encouraged them to contribute in the service of nation.

On the eve of the Independence day, the CDRI staff club had organized an Illustrated Reading by Dr. Saman Habib and Dr. Sanjay Muttoo – Lucknow in Letters: Endeavors, Achievements and Tragedies.

1.4. 76th Republic Day Celebrations, 26 January 2025

The CSIR-CDRI family celebrated the 76th Republic Day with great enthusiasm. On the occasion, Dr. Radha Rangarajan, Director hoisted the flag and addressed the staff, students and family members.

On the eve of the Republic Day, the staff club of CDRI had organized Flute Concert by Ms. Alka Thakur, a contemporary flute artist from Lucknow.

1.5. CSIR One Week One Theme (OWOT) - CSIR Healthcare Theme. 13-14 November 2024

CSIR-CDRI Lucknow hosted a two-day Thematic Conclave on November 13-14, 2024, under the theme "India's R&D Priorities for Affordable Healthcare" as a part of the CSIR One Week One Theme (OWOT) initiative. The event featured leading scientists, healthcare experts, and policymakers who discussed India's healthcare priorities, including gene editing for genetic disorders, antimicrobial resistance (AMR), and innovations in cancer treatment.

The event began with the inauguration of the CSIR Healthcare Theme Tech-show by Chief Guest Shri Partha Sen Sharma, Principal Secretary, Medical Health & Family Welfare Department, Government of Uttar Pradesh. In his address, Shri Sen Sharma emphasized the need for affordable healthcare innovations in strengthening India's health ecosystem. Attendees explored advances in gene-editing therapies for genetic disorders, solutions for sickle cell disease, and the development of active pharmaceutical ingredients aimed at reducing healthcare costs. The exhibition was attended by medical and pharmaceutical students.

During the program Collaborative Agreement has been signed between CSIR-CDRI and King George's Medical University (KGMU) for the project titled "Development of In-house TaqMan-like Probe Based RT-PCR Detection Kit for Arboviral Infections."

The next session focused on Anti-Microbial Resistance (AMR), a critical global health issue. The session covered CSIR's AMR mission, chemical genetic approaches to combat antibiotic resistance, and the discovery and development of new compounds, such as BWC0977, for treating multi-drug-resistant (MDR) bacterial infections. A panel discussion moderated by Dr. Radha Rangarajan engaged experts such as Dr. Ranjana Pathania from IIT Roorkee, Dr. Harish Kaushik from Bugworks, and Dr. Abdul Ghafur from Apollo Hospital, Chennai, who discussed innovative approaches to combatting AMR.

1.6. National Technology Day Celebrations 14 May 2024

National Technology Day celebrated in CDRI on May 14 to commemorate the country's technological advancements. The day also aimed to encourage scientific research and innovation, especially among young minds. Dr. Shinjini Bhatnagar, Distinguished Professor, THSTI, Faridabad, graced the occasion as Chief Guest and delivered a lecture entitled "Research from evidence to clinical practice and policy priorities early" under the Translational Research Lecture Series. During the event, the Annual Report 2023-24 was released. During the event technology innovators from CSIR-CDRI were felicitated by the dignitaries.

1.7. Translational Research Lecture Series

During the year 2024, CSIR-CDRI initiated a new series of lectures entitled "Translational Research Lecture Series". Under this series, leading clinicians in the various disease areas are invited to interact with CSIR-CDRI researchers and deliver a lecture. The objective of this series is to bring the academia and clinicians together and have a clinical perspective on the disease area. Institute looks forward to evolve collaborative research programs that have high translational value. The academia can learn the recent developments in the clinic and become aware of the patient unmet needs and the cutting edge research being carried out. This activity will give further impetus to the institutes drug discovery program and translational research. Lectures are being held on quarterly basis.

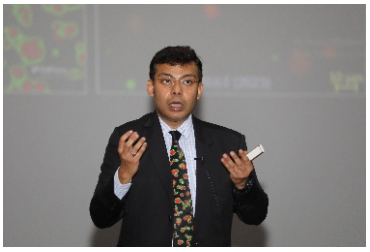
On 16th August, 2024, Dr. V. Mohan, Chairman, Dr. Mohan's Diabetes Specialities Centre at Chennai delivered a lecture on "Precision Diabetes- Where are we in India today?".

Dr. Sugandha Arya, Professor of Pediatrics, and Incharge Mother-NICU, VMMC and Safdarjung Hospital, New Delhi, delivered a lecture entitled "Immediate Kangaroo Mother Care and Mother Newborn Care Unit: Journey from Evidence to Practice" on December 10, 2024

1.8. Innohealth Lecture Series

CSIR-CDRI introduced a Innohealth lecture series aimed at bringing to CDRI, scientists who have done cutting edge research in therapeutic areas of interest to us. Speakers may be engaged in basic or applied research, spanning the gamut of disciplines from biology to chemistry to computer science. Their work should focus on disease pathogenesis, detection, diagnostics or therapeutics.

The Second lecture in the series was delivered by eminent cancer biologist Dr. Bushra Ateeq, Professor at Kanpur IIT on 04 June 2024. She delivered lecture on "Molecular Characterization of Prostrate Cancer: Prospects of Precision Medicine in India" spoke about molecular cues for prostate cancer development in India and shed light on possible therapeutic interventions.



Dr. Samrat Mukhopadhyay of IISER Mohali delivered third lecture in the series on 05 August 2024 and enlightened us with his recent discoveries in neuro science. He delivered a lecture on "Biological Condensates: Friend or Foe".

Dr. Debabrata Maiti of IIT Bombay, was our last speaker for 2024 who mesmerized the audience with his amazing chemistry that he has been doing in India for last decade. He delivered lecture on "Unlocking new chemical space via selective catalysis" on 25 October 2024.

1.9. Alumni Talk, 02nd January 2025

Institute has initiated an "Alumni Talk" series, bringing together prominent alumni to share their experiences and insights with current students and researchers. These talks aim to inspire and guide future innovators in the fields of drug discovery and related disciplines. First lecture in the series was delivered by Dr. Vinayak Singh, Faculty member of the University of Cape Town, who did PhD from CSIR-CDRI in 2005.

1.10. 7th CSIR-CDRI Nobel Symposium, 11th December 2024

It has been the tradition of the CSIR- CDRI to organize the Nobel Symposium every year in recognition of the achievements of the recently awarded Nobel Laureates in the field of the Physiology or Medicine & in the Chemistry to enlighten the CDRI fraternity with the scientific accomplishments of the laureates in their respective fields. Taking the convention ahead, this year a group of research scholars from different divisions and areas of research came together as a team to honor the achievements of Nobel Laureates of the year and enlighten the CDRI fraternity with their breakthrough work on 11th December 2024.

The program was held in two sessions. The first session was to celebrate the Nobel Prize in Chemistry 2024 conferred to Dr. David Baker, Dr. Demis Hassabis and Dr. John Jumper for "the Computational Protein Design" and for "the Protein Structure Prediction". The session was moderated by Shilpa and the first talk was delivered by Abdul Basit Khan on "Protein Folding : Cracking Nature's Origami Code" emphasizing on the Protein Folding Problem and Emergence of AI and ML in Structural Biology followed by Astbhuja Mishra on "Revolutionizing Life's Building Blocks : David Baker's Journey from Folding to *De Novo* Protein Design" describing the invention of Protein Designing and accomplishments of Dr. David Baker whereas Imran Ansari closed the session with his talk on "AlphaFold2 : From Algorithms to Breakthroughs" focused on the developmental story in Protein Structure Prediction Biology that culminated in the form of Alphafold2.

The session two of the symposium was for the Nobel Prize in Medicine/Physiology 2024 shared by Dr. Vichor Ambros and Dr. Gary Ruvkun for "Discovery of microRNA and its Role in Post Transcriptional Regulation". This session was moderated by Deepanshi Saxena and talks were delivered by Neha Agarwal on "From Small Worm to Major Breakthrough: The Unexpected Discovery of microRNA" and Pranoy Toppo on "Unveiling the extensive role of microRNAs in Eukaryotic Gene Regulation.

The Symposium was presided and guided by the Director, Dr. Radha Rangarajan along with mentorship of Dr. J Venkatesh Pratap, Dr. M. Imran Siddiqi, Dr. Aamir Nazir and Dr. Kinshuk R. Srivastava. The Symposium reached to its end with the Director's remarks and further felicitation to the Speakers and the Moderators.

1.11. 9th International Conference on Current Trends in Drug Discovery Research, 19-22nd February 2025

The 9th "International Symposium on Current Trends in Drug Discovery Research" was held at CDRI during 19-22 February 2025. Prof. Balram Bhargava, Dean and Senior Consultant, Holy Family Hospital, New Delhi & Former Director General, ICMR graced the occasion as Guest of Honour in the Inaugural event. Dr. N. Kalaiselvi, Director General, CSIR & Secretary DSIR graced the occasion as Chief Guest. She stressed that such gatherings provide a great opportunity for researchers, industry leaders, and young minds to collaborate, fostering innovation in pharmaceuticals and healthcare. She added that Science has no borders, and this program is a gateway for global collaboration. In the inaugural program, Prof. Christopher Robert McCurdy, Professor and The Frank A. Duckworth Eminent Scholar Chair, University of Florida, USA, has delivered the inaugural talk on "Seeing Pain: from the lab to the clinic, a medicinal chemist's journey."

The three days' event featured over 40 oral presentations, 24 flash talks and more than 300 poster presentations in 14 sessions. Speakers come from academia and industry and from 8 countries. There were more than 650 participants in attendance, of which 440 were students.

The CTDDR 2025 was concluded with the brain storming panel discussion by the stalwarts on "Preparedness for Emerging Global Health Challenges". Dr. Anil Koul, London School of Hygiene and Tropical Medicine, UK, Dr. Daniel Goldberg, Bill & Melinda Gates Foundation, USA, Prof. Christopher R. McCurdy, University of Florida, USA, Prof. Ian H. Gilbert, University of Dundee, UK, and Dr. Radha Rangarajan, Director, CSIR-CDRI, Lucknow, were the panellist.

In the valedictory function, the young budding scientists were felicitated with four best flash talk awards and 34 best poster awards to the participants from every nook and corner of India. The symposium was concluded with the vote of thanks by Dr. Kumaravelu Jagavelu and Dr. Kishor Mohanan, the organizing secretary and co-organizing secretary of the event.

1.12. Workshop on Diversity, Equity, and Inclusion, 24th July 2024

CSIR-CDRI; has been recognized as "GATI Achiever", by the DST, Govt. of India. This is a prestigious recognition for the remarkable work done for women in STEM through GATI program. Continuing the commitment to foster the impactful changes for promoting more participation of women and girls in science, CDRI organised a workshop entitled, Diversity, Equity and Inclusion" facilitated by Ms. Kanika Mehrotra, on 24th July 2024. More than 100 students, faculty and staff participated actively in the workshop that evoked the importance of equity and inclusion.

1.13. Workshop on Practical Aspects of Drug Discovery, 03 – 08th November 2024

The joint CSIR-CDRI and The Wellcome Centre for Anti-infectives Research, University of Dundee (UK) workshop on 'Practical Aspects of Drug Discovery' began on Nov. 3. This six-day workshop is being attended by participants from the Indian pharmaceutical industry and academia. The first two days had deeply engaging sessions and lively discussion. The workshop will cover aspects of defining target product profiles, drug design, ligand efficiency, target identification and validation, pharmacokinetics, natural products/ phytopharmaceuticals, intellectual property protection and more through talks and practical workshop sessions.

1.14. Team Building Workshop, 2nd January 2025

CSIR-CDRI organised a team building workshop for the staff of Finance, Administration, Stores and Purchase and Project Management teams. The objectives of the workshop included; 1) Building a cohesive culture focused on the institution's needs, 2) Conflict resolution by discussion and 3) Time bound decision making. Ms. Kanika Mehrotra a Communication, Management, Training consultant facilitated the workshop on 2nd January 2025. This one-day workshop equipped with various activities to achieve the set objectives was welcomed by all the participants.

1.15. National Sports Day Celebrations, 29th August 2024

Institute celebrated that National Sports Day on August 29th to commemorate the birth anniversary of hockey legend Major Dhyan Chand. During the day, Director addressed the staff and students and emphasize the importance of sports and physical activity for overall health and fitness. As a part of celebrations, sports events were organized in the campus for staff and students.

1.16. AcSIR Science Club and ACS Student Chapter

To enhance student engagement and promote science communication within CSIR-CDRI, the AcSIR Science Club and the ACS Student Chapter were established. These student-led bodies organized several initiatives during the year.

Student Guidance Programs:

A talk on AcSIR Joint PhD Programs by Mr. Piyush Gupta, AcSIR Executive, CSIR-CDRI, on 6th November 2024.

A lecture on Changing Dynamics of the Indian Pharmaceutical Sector by Dr. Anil N. Gaikwad, Senior Principal Scientist, Pharmacology Division, CSIR-CDRI, on 25th November 2024.

Outreach Activities in Collaboration with Jigyasa:

Engagements with students from four government schools, featuring science demonstrations, quizzes, and popular science talks.

Established Student Corner (A space to breath and be yourself):

Student Corner at CSIR-CDRI is a thoughtfully designed open-air space dedicated to student relaxation and well-being. Adorned with vibrant flowers and tranquil aquariums, it offers ample seating on stone benches and pathways for leisurely walks. This serene environment provides a perfect setting for students to unwind, reflect, and rejuvenate amidst nature.

PhD Induction Program :

Academic Affairs Unit conducts induction programs called Shodhaarambh biannually to welcome newly admitted Ph.D. scholars. A distinctive feature of these programs is the "green initiative," where each new student plants a sapling in the Student Corner. This act symbolizes the beginning of their research journey, with the responsibility of nurturing the plant paralleling their academic growth. Upon completion of their Ph.D., the outgoing scholars pass the care of their plants to incoming students, fostering a sense of continuity and environmental stewardship within the research community.

1.17. Ayurveda Day Celebration Sponsored by Ministry of Ayush, 29th October 2024

On the occasion of 9th Ayurveda Day celebration (29th October), 2 programs were successfully organized by CSIR-CDRI are as follows :

Dr Sanjeev Kumar Ojha invited and delivered a popular talk on "Understanding Art and Science of Ayurveda" at CSIR-CDRI, Auditorium Hall 2 at 10:30 am. Dr Shail Singh & Dr. Vivek Bhosale organized an Ayurveda Day program at CDRI on the theme "Ayurveda Innovation for Global Health". The Director of CDRI presided over the function. Dr Ojha suggested that a daily routine as per Ayurveda is absolutely necessary to bring radical change in body, mind, and consciousness.

Shri Brajesh Pathak, Hon'ble Deputy Chief Minister and Health Minister of Uttar Pradesh, visited the CSIR Central Drug Research Institute (CDRI), Lucknow to witness the digital inauguration of four prestigious AYUSH Centres of Excellence (CoE) by the Honourable Prime Minister of India. CSIR-CDRI, Lucknow is one among them. This initiative underscores India's strong commitment to integrating traditional medicine with modern healthcare practices. Shri Brajesh Pathak unveiled the plaque for the CDRI's AYUSH Centre of Excellence, marking the centre's official inauguration.

1.18. International Yoga Day, 21st June 2024

Institute celebrated the International Day of Yoga on 21 June 2024 under the theme 'Yoga for self and society'. As a part of the event, Dr. Ashish Arora, Senior Scientist, CSIR-CDRI imparted Yoga Training to the staff and students of CSIR-CDRI.

1.19. Rashtriya Boudhik Sampada Mahotsav (World Intellectual Property Day Celebrations), 26th April 2024

CSIR-CDRI celebrated the WORLD IP DAY on 26th April 2024 as per the theme "IP and the SDGs: Building our common future with innovation and creativity".

Scientists & research students from CSIR-CDRI, scientists from CSIR-CIMAP & CSIR-IITR had attended the program. The program featured presentations by Dr. Lipika Patnaik, CSIR-IPU, New Delhi and Mrs. Sweta Rajkumar, Deputy Controller -Indian Patent Office, New-Delhi.

Director of CSIR-CDRI, Dr. Radha Rangarajan, extended a warm welcome to the speakers and highlighted the pivotal role of scientists in translating inventions for economic growth. Dr. Rangarajan further emphasized the significance of IPR in recognizing and safeguarding innovations, ultimately contributing to human welfare and industrial advancement.

Dr. Lipika Patnaik delivered a comprehensive session elucidating the fundamentals of patents, dissecting the various components of patent specifications, and imparting essential techniques for drafting effective claims. She delved into critical aspects such as crafting the title of invention, summarizing the invention's field, and outlining essential points for patent applications.

Continuing the discourse, Mrs. Sweta Rajkumar presented illuminating case studies, addressing common objections raised during examinations and emphasizing the importance of clarity and specificity in patent claims. Her insights provided attendees with valuable guidance on navigating the complexities of patent applications.

The program provided a platform for students and researchers to gain deeper understanding of the patenting process, including filing procedures, required documents, and key stages of patent applications.

1.20. Swachchta Pakhwada, 1-15th May 2024

CSIR-CDRI celebrated Swachhta Pakhwara (1-15 May, 2024), Swachhta Hi Seva (SHS) from 17th September to 2nd October, culminating in Swachh Bharat Diwas (SBD) on 2nd October 2024, marking the birth anniversary of the Father of the Nation, Mahatma Gandhi (Bapu Ji). Various activities including the Swachhta Pledge, clean campus drive, cleaning of Drinking water tanks, awareness among the students and staff, Mass rally, Drawing & Painting Competition etc. was initiated under Swachhta action Plan.

Under the Special Cleanliness 4.0 initiative of Government of India, CSIR-CDRI actively participated in a comprehensive cleanliness campaign. Extending its reach to the community, CSIR-CDRI conducted a cleanliness drive at the Bakshi Ka Talab (BKT) railway station. As part of the Swachhta Action Plan, CSIR-CDRI installed sanitary pad vending machines and disposal units, promoting hygiene and reinforcing the habit of cleanliness.

As next phase of campaign, old records were identified for weeding out and submitted to the committee, resulting in the selection of more than 700 physical files for disposal in accordance with existing CSIR disposal practices. Additionally, over Rs 18.6 lakhs in revenue was generated through the e-auction of old and obsolete R&D items.

As planned for clearance and mutilation program, sites were identified and cleared as part of the Special Cleanliness Drive 4.0. Approximately 10,000 square feet of area was cleared and prepared for the development of a horticulture lawn.

Under the leadership of Director of CSIR-CDRI, Dr. Radha Rangarajan, led a tree plantation activity with fifty newly joined staff members & students participating in the initiative.

1.21. CRTDH Conclave – Good Manufacturing Practices, 23rd November 2024

Under the Umbrella of DSIR-CRTDH, the Institute has organized a Conclave of Drug Industry, Medicine, Discovery Research and Regulation entitled "Good Manufacturing Practices: Opportunities and Challenges of the (Revised) Schedule M".

Distinguished dignitaries including Dr. Rajeev Singh Raghuvanshi, Mr. SM Gupta, Prof. Sarman Singh, Prof Vimala Venkatesh, Prof. Nuzhat Husain, Prof. Padma V Devarajan, Prof. Dipyaman Ganguly, Mr. Vir Anjani Kumar Saxena, Mr. Tenneti Srikrishna and Dr. Ashok Omray participated in the conclave. This program was part of the activities of a Common Research and Technology Development Hub in the area of Affordable Healthcare, funded by the Department of Science and Technology, Government of India and CSIR, India. Panels of domain experts discussed Regulatory rationale for revisions to Schedule, Medical need for stringent regulation of drug manufacturing, and Aligning academic drug research with stringent regulation.

1.22. Vigilance Awareness Week, 28th October – 03rd November 2024

CSIR-CDRI organized the Vigilance Awareness Week during 28 October to 3rd November 2024. As a part of the event, the Director administered the integrity pledge to all the staff on 30 October 2023. As a part of the event, several programs were organized including Pledge on Vigilance, visit to Schools for creating awareness among the students, debate, quiz competitions, Nukkad natak, Lectures relevant to create awareness among the staff and students towards vigilance.

During the week, an inspiring lecture on the theme "Culture of Integrity for Nation's Prosperity," delivered by Dr. Satya Narain Sabat, IPS, Director General, CBCID, Uttar Pradesh Police. Dr. Sabat, as the chief guest, shared valuable insights on how a commitment to integrity serves as the bedrock of a prosperous nation. During the closing ceremony, Dr. Radha Rangarajan, Director of CSIR-CDRI, honored Dr. Sabat and expressed gratitude for his thoughtful address. As a part of the awareness week, several activities were organized including Oath taking by the staff and students.

1.23. International Women's Day Celebrations, 01 – 31st March 2025

Institute celebrated the International Women's Day with a series of events throughout March to promote women's health and well-being. As part of this initiative, CSIR-CDRI hosted a Health Awareness Program focusing on Free Women's Health Check-up & Cervical Cancer Awareness in association with KGMU, Lucknow. Dr. Rekha Sachan, Senior Gynecologist, KGMU, and Dr. Malti Maurya, Expert Pathologist, KGMU coordinated the event.

As a part of the celebrations, Science Video Production and a month long Art Exhibition was organized showcasing talent through powerful visual stories on gender, science, and equality.

On 17 March 2025, Ms. Kanika Gupta, Journalist & Documentary Filmmaker, delivered a talk on 'Beyond the Binary.' She highlighted the contributions of the LGBTQ+ community in STEM, breaking barriers and redefining possibilities.

An insightful talk by Ms. Nandita Jayaraj, Freelance Science Writer was organized on 24 March 2025. She shed light on the Gender Gap in Indian STEM & the challenges women face in the field.

As part of the event, an engaging panel discussion on Challenges for Women in STEM was held. The distinguished panelists including Dr. Amit Misra & Dr. Ritu Trivedi from CSIR-CDRI, Dr. Aruna Satish, CSIR-IITR & Dr. Geetanjali Mishra from Lucknow University shared their perspectives. The discussion reinforced the need for continued dialogue, policy reforms, and community support to bridge the gender gap in STEM. The event also celebrated creativity and scientific expression. Winners of various competitions were felicitated for their outstanding contributions.

1.24. Hindi Rajbhasa Activities (Throughout the year)

As part of Hindi Rajbhasha activities, the Institute organized multiple programs including Hindi Karyashala, Hindi Pakhwada, and Hasya Kavi Sammelan. In the 14-day long Hindi Pakhwada program, competitions of different genres, such as dictation writing, original Hindi slogan, poem recitation, note writing, essay writing, and Hindi Translation were organized.

1.25. Annual Sports Events (January – February 2025)

As a part of the 74th CSIR-CDRI Annual Day, the Staff Club of the Institute organized various Indoor and Outdoor sports activities, including Badminton, Bridge, Campus Run, Carom, Chess, Cricket, Football, Kabaddi, Table Tennis, Volleyball for the staff and students of the Institute during January 2025. Large number of students, staff, family members participated in the sports events and exhibited sportive spirit and team building skills. Winners were felicitated during the Annual Day event on 17 February 2025.

2 Distinguished Visitors and Lectures

Distinguished Visitor	Title of Lecture	Date
Dr. Zahra Iqbal Scientific Editor, BBA Journals, Elsevier, Amsterdam	Careers in Scientific Publishing	15.04.2024
Mr. Venkatesh Voleti Director (Technical Sales), Biotron Healthcare (India) Pvt Ltd, Mumbai	Quantitative High Content Drug Discovery Screening (Powerful Tool to Study Effects of Physiologically Active Substances)	24.04.2024
Dr. Mohit Kumar Jolly Associate Professor, Centre for BioSystems Science and Engineering (BSSE), IISc Bangalore	What Does Not Kill Cancer Makes it stronger-Dynamical Mechanistic Modeling of Drug-Induced Cell-State Switching	24.04.2024
Dr. Anita Shantaram Founder and Director, Ethics India, A Legasis Company, Mumbai	Ethical Excellence and Principles of Conduct in Research and Governance	21.05.2024
Ms. Jishyra Serrano Program Manager, Global Engagement, ACS	ACS Student Chapter Info Session	10.05.2024
Dr. Manoj Kumar Eli Lilly and Co., USA	Non-systemic ENaC Inhibitors for the Treatment of Cystic Fibrosis	04.07.2024
Dr. Raj Kumar Verma Assistant Professor, Department of Neurosciences, School of Medicine, UConn Health Center, Farmington CT, USA	Role of Purinergic Receptor P2X4 in the Treatment of Ischemic Stroke	09.08.2024
Dr. Anirban Ghoshal Postdoctoral Research Associate, Eshelman School of Pharmacy, University of North Carolina, Chapel Hill, USA	Discovery of CHIKV nsP2 Protease Inhibitors with Antiviral Activity	03.09.2024
Dr. Arumugam Jaykumar PhD, Senior Research Scientist, Department of Experimental Therapeutics, MD Anderson Cancer Center, Houston, TX, USA	Development of Small Molecule Inhibitors for Cancer Therapy: WP1066 Evaluation	18.09.2024
Prof. Moira O'Bryan Dean, The Faculty of Science, University of Melbourne, Melbourne, Australia	MDH1B – A Role in Sperm Metabolism and Viability as a Contraceptive Target	19.09.2024
Dr. Abhishek Mohanty Program Director, HCG Center for Biotechnology & Biobanking and Cancer Biomarker Discovery, Regional Director (South India), Biobank India Foundation	Tumor Banks Fueling the Multiomics based Practice of Personalized Oncomedicine and Cancer Biomarker Discovery	25.10.2024
Prof. Sarman Singh Former Director & CEO, All India Institute of Medical Sciences, Bhopal	End Tuberculosis by 2025: Challenges and Opportunities	22.11.2024
Prof. Santhi Gorantla Director, Translational Mouse Models Core, Department of Pharmacology and Experimental Neuroscience, University of Nebraska Medical Center, USA	Humanized Mouse Models for HIV Infection and Therapeutic Strategies	26.11.2024
Dr. Adarsh Kumar Postdoctoral Researcher, Structural Genomics Consortium (SGC), Goethe Unviersity, Frankfurt, Germany	Exploring LC3B Binding Pockets for Degrader Development	27.11.2024
Dr. Afreen Haider Principal Scientist, Cancer Research Horizons Cambridge, UK	Targeting Success: Strategies and Innovations in Early Drug Discovery	04.12.2024

Prof. P. V. Ramachandran Department of Chemistry, Purdue University, West Lafayette, USA	Allylboration to Antibiotics	05.12.2024
Dr. Ashok Kumar Pandey Scientist, CSIR-IICT, Hyderabad	Innovative Approaches to C-H Functionalization and Alkene Isomerization: Paving the Way to the Synthesis of Medicinally Important Molecules	13.12.2024
Dr. Suman Mallik Former Chief Scientist and Head, Knowledge Resource Center, CSIR-CDRI, Lucknow	Unethical Publications: Retraction and Beyond	26.12.2024
Dr. Reshma Bhattacharya Professor & Co-Leader, Cancer Biology Program, SCC, University of Oklahoma, Health Sciences Center, USA	Exploring and Establishing Novel Targets in Cancer	19.12.2024
Dr. Vinayak Singh Faculty, University of Capetown, Alumnus of CSIR-CDRI, Lucknow (July 2005 – Nov 2010)	Chhatar Manzil Palace to Table Mountain: A 20-Year Journey in Drug Discovery	02.01.2025
Prof. M. S. Baig Department of Biosciences and Biomedical Engineering (BSBE), Indian Institute of Technology (IIT), Indore	Regulatory Mechanism in Chronic Inflammatory Diseases	06.01.2025
Prof. Samir Z. Zard Laboratoire de Synthse Organique, Ecole Polytechnique, Palaiseau, France	Radicals in Action. New Perspectives for Organic Synthesis and for Medical Chemistry	24.01.2025
Prof. Aled Edwards Professor, University of Toronto, Founder and Chief Executive, Structural Genomics Consortium, Toronto, Canada	Target 2035: Protein-Ligand Data at Scale to Enable Machine Learning	25.02.2025

3 Faculty Seminar Series

Dr. Namrata Rastogi
The Chemical Acrobatics of Diazo Compounds
04-04-2024

Dr. Divya Singh
The Role of MicroRNAs in Bone Diseases and their Therapeutic Potential
18-04-2024

Dr. Mukesh Pasupuleti
Cryptic Peptide Sequences as Next Generation Therapeutics
02-05-2024

Dr. Ravindra Kumar
Breaking the Molecular Symmetry from Planner to sp3-rich Polycyclic Heterocycles: Strategy and Exploration
30-05-2024

Dr. Dipak Datta
Understanding Therapeutic Vulnerabilities of Triple Negative Breast Cancer (TNBC)
13-06-2024

Dr. Naibedya Chattopadhyay
Therapeutic Repurposing: Lessons Learned and Translational Opportunities Identified
27-06-2024

Dr. Smrati Bhadauria
Understanding and Targeting Metastatic Breast Cancer: Our Journey with mTORC2
11-07-2024

Dr. KV Sashidhara
The Trials and Tribulations of Natural Product-Based Drug Discovery
25-07-2024

Dr. Shakil Ahmed
Using Fission Yeast as model system for Drug Target Discovery
08-08-2024

Dr. Dibyendu Banerjee
DNA Damage and Repair Proteins in Cancer Therapeutics
22-08-2024

Dr. Amit Misra
You are invited to please subject CDRI's forthcoming IND application for a Phase 1 clinical trial of Centinhale to a critical, merciless and hostile review
12-09-2024

Dr. Sudheer K Singh
Mycobacterial Persistence and our Strategies for its Mitigation
14-11-2024

Dr. Manju Y Krishnan
Exploring Persistence in *Mycobacterium tuberculosis*: Host-Relevant Models Developed
16-01-2025

Dr. Sanjay Batra
Phenotypic or Rational Approach: Dilemma of Drug Discovery Research in Academics
13-02-2025

Dr. Manish Chourasia
Formulation Approaches for Enhanced Therapeutic Outcome
13-03-2025

4 Visits and Deputations Abroad

Dr. Radha Rangarajan, Director, CSIR-CDRI

- Invited to attend the Non-Hormonal Contraceptive Discovery Meeting of the Bill & Melinda Gates Foundation (BMGF) Berlin, Germany from 05-08th May, 2024.
- Invited to participate in the Tres Cantos Open Lab Foundation (TCOLF) Governing Board Meeting at Tres Cantos Madrid in Spain from 07-09th October 2024.
- Invited to attend the Discovery & Translational Sciences, Global Health's Fall 2024 Non-Hormonal Contraceptive Program Meeting, Seattle, Washington, USA from 18-20th November 2024.

Dr. Niti Kumar, Principal Scientist

- Invited to attend the Discovery & Translational Sciences, Global Health's Fall 2024 Non-Hormonal Contraceptive Program Meeting, Seattle, Washington, Seattle, WA, USA from 18-20th November 2024.

Dr. Arunava Dasgupta, Senior Principal Scientist

- On deputation to visit the Laboratoire Chimie de Coordination (LCC-CNRS), Toulouse, France, from 27th November to 11th December 2024.

Dr. Amit Lahiri, Principal Scientist

- On deputation under Raman Research Fellowship for the year 2024-2025 to carry out the research at University Hospital Dusseldorf, Germany from 31st January to 27th April 2025.

5 Membership of Distinguished Committees & Boards

Dr. Radha Rangarajan, Director

- Member, Advisory-cum-Monitoring Committee of Biotech Park, Lucknow
- Member, Biotechnology Vision Group for Uttar Pradesh
- Member, Scientific Advisory Committee (SAC) of CBMR, Lucknow
- Chairperson, Award Committee of SGPGIMS, Lucknow
- Member, Board of Governors, Tres Cantos Open Lab Foundation
- Member, Hub Governing Body of BioCyTiH Foundation, a Technology Innovation Hub of BITS Pilani
- Member, Scientific Program Committee of IHub-Data, an initiative of the International Institute of Information Technology, Hyderabad
- Member, Research Council of CSIR-NCL, Pune
- Member, Advisory Committee for CSIR Innovation Complex, Mumbai
- Member, Board of Governors of Academy of Scientific and Innovative Research (AcSIR)
- Member/Subject Expert, Standing Expert Committee, constituted by DG, CSIR to review & evaluate the joint project proposals under unilateral, bilateral and multilateral programs of CSIR and the nominations under HR capacity building programs of CSIR
- Member, Selection Committee for the Sree Padmavathi Venkateswara Foundation for grants in Translational Biomedical Sciences
- Member, CSIR Jigyasa Programme Task Force Committee
- Director, Atal Incubation Centre- Centre for Cellular & Molecular Biology
- Member, Expert Panel of Reviewers for Ignite Life Foundation
- Expert Member & Co-Chair, ICMR Health Product Screening Committee

Dr. Saman Habib

- Co-Chair, Technical Expert Committee (TEC) for Infectious Disease Biology, DBT, New Delhi (2022-25)
- Member, Selection Committee for INSPIRE Faculty (DST) (2022-25)
- Core-member, Program Advisory Committee (PAC) on Organismal and Evolutionary Biology (OEB) under Life Sciences, SERB
- Member, Expert Committee of S. Ramachandran National Bioscience Fellowship for Career Development, DBT, New Delhi
- Member, Selection Committee for ASPIRE projects in Life Sciences (CSIR)
- Member, SRF and RA selection committee for General Biology, CSIR-HRDG.
- Expert Reviewer for Ignite Life Science Foundation (2025-2028)
- Life Member, Indian Society of Cell Biology
- Life Member, Society of Biological Chemistry
- Fellow, Indian National Science Academy, New Delhi (2021)
- Fellow, Indian Academy of Sciences, Bengaluru (2016)
- Fellow, The National Academy of Sciences, Prayagraj (2015)

Dr. S.K. Rath

- Member, National Advisory Board, Task Force of the CIF establishment at the National Institute of Siddha, Chennai
- Member, Subject Expert Committee, Cellular Biology/Stem Cell Biology-based drug product for clinical trial, DCGI (2023 onwards)
- Member, Subject Expert Committee for INDs for clinical trials, DCGI (2020 onwards)
- Member, Cosmetics evaluation committee for reviewing and implementing the decision of the Minamata Convention on Mercury in India (2023 onwards)
- Member, Committee for review and decision on Ranitidine toxicity (2024)
- Member of the Selection committee, for selection of Associate Professors and Assistant Professors in NIPER, Mohali, Chandigarh
- Chairman, Selection Committee for Group III, technical staff, CSIR-IITR
- Chairman, Selection Committee for Group III, technical staff, CSIR-IGIB
- Chairman, Screening Committee for Group IV, Scientists, CSIR-IGIB
- Member, Selection Committee for Group III, technical staff, CSIR-CDRI
- Chairman, Investment Committee, CSIR-CDRI
- Chairman, PhD student selection committee, CSIR-CDRI
- Chairman, SDC, CSIR-CDRI
- Member, Laboratory Strategic Group, CSIR-CDRI
- Member, CDRI Strategic Group, CSIR-CDRI
- Member, IHP evaluation and review committee, CSIR-CDRI
- Member, TRG, CSIR-CDRI
- CCSEA Main Nominee, Institutional Animal Ethics Committee, IIT Kanpur, India
- CCSEA Main Nominee, Institutional Animal Ethics Committee, NBRI, Lucknow, India
- CCSEA, Scientific Member, IAEC, Aryakul group of Institutions, Lucknow
- CCSEA Scientific Member, IAEC, NIPER- Raebareli

- CCSEA, Scientific Member, IAEC CIMAP, Lucknow
- General Secretary, Society of Toxicology of India, October 2024 onwards
- Life-Member, the Indian Society of Cell Biology
- Life-Member, Environmental Mutagens Society of India
- Life-Member, ADNAT
- Life-Member, Society for Biotechnologists, India
- Life-Member, Odisha Bigyan Academy
- Life-Member, Association of Toxicologists and Risk Assessors (ASTRA)

Dr. Amit Misra

- Life Member, Indian Pharmaceutical Association
- Vice-President (India): Asian Federation for Pharmaceutical Sciences
- Member, South Centre (Geneva) and Third World Network (Kuala Lumpur) Consultative Groups on Biologicals and Biosimilars
- Member, Subject Expert Committee (Antimicrobial, Antiparasitic, Antifungal, Antiviral) of CDSCO advising DCGI for New Drug approvals
- Member, Medical Biotechnology and Medical Nanotechnology Sectional Committee (MHD 20) of the Bureau of Indian Standards, Government of India
- Member, Board of Studies, Jamia Hamdard, New Delhi
- Member, Board of Governors, NIPER, Hajipur
- Life Member, Indian Pharmaceutical Association
- Member, Controlled Release Society India Chapter
- Member, CSIR SRF/RA Selection Committee on "Medical and Pharmaceutical Sciences (MEDIC/11)."
- Member, Board of Studies, Jamia Hamdard, New Delhi
- Member, Board of Studies, Madan Mohan Malaviya University of Technology, Gorakhpur
- Member, Board of Governors, NIPER, Hajipur

Dr. Sanjay Batra

- Chairperson, SERB (now ANRF) Committee for the POWER scheme for Physical sciences
- Member, CSIR Committee for the Emeritus scheme
- Member, Selection Committee for the NASI fellowship (Allahabad)

Dr. Gautam Panda

- Member, Mext Fellowship Evaluation Committee, Japan
- Elected fellow of West Bengal Academy of Science and Technology (FAScT)

Dr. Atul Goel

- President, Luminescent Organic Consortium of India (LOCI)
- Fellow of Indian Academy of Sciences (FASc), Bengaluru
- Editorial Board Member, Journal of Biochemical and Molecular Toxicology (Wiley Publication)
- Member, Board of Studies (Applied Sciences), Institute of Engineering & Technology, Lucknow
- Life Member (LM-4155), The Society of Biological Chemist (SBC), Bengaluru, India
- Life Member (L-31190), The Indian Science Congress Association (ISCA)
- Life Member (LM-1435), Chemical Research Society of India (CRSI)
- Life Member, Indian Chemical Society (ICS), Kolkata
- President, Luminescent organic Consortium of India
- Board Member, National Council of the International Association of Advanced Materials, Sweden

Dr. Bhupendra N Singh

- Vice President, All India Society of Cell Biology

Dr. Prabhat Ranjan Mishra

- Life Member, The Society of Biological Chemists, Bangalore, India (No 4268)
- Life Member, Indian Pharmaceutical Association (No. DLH/LM/0374)
- Life Member, Indian Society of Cell Biology (No. 2014037)
- Executive Member, Indian Society of Cell Biology
- Expert Member, Project Monitoring Committee, BIRAC, Department of Biotechnology, Govt. of India: Being a member of Biotechnology Industry Research Assistance Council (BIRAC), discharge my duties in evaluating proposals submitted to BIRAC and inspecting at manufacturing sites as and when required (Since 2016 to till date)
- Member, Board of Studies, Department of Pharmaceutics, Jamia Hamdard, New Delhi: As a member of board of studies involved in assessing and discussing issues related to academics. (Since April 2018 to till date)
- Member, Technical committee (BIS) Medical biotechnology and nano-technology, Govt. of India. (Since 2012 to till date)
- Course Coordinator (Pharmaceutics), National Institute of Pharmaceutical Education and Research, Raebareli (CSIR-CDRI-mentoring Institute) (2011 to 2017)
- Recognized Ph.D. supervisor of Jawaharlal Nehru University, New Delhi, Banasthali Vidyapeeth, Jaipur, Jamia Hamdard, New Delhi, and AcSIR, New Delhi
- Member Academic Committee, Jawaharlal Nehru University, New Delhi (JNU-CIMAP)
- Expert Member, Academic Advisory Committee, NIPER-Raebareli
- Member, Senate, NIPER-Raebareli

Dr. Sanjeev Kanojia

- Member, Bureau of Indian Standards (BIS), Govt. of India (Organic Chemicals, Alcohols & Allied Products)
- Task Force-Member, Equipment Utilization of Various R&D Institutions in India, DST, Govt. of India
- Member, High-end Equipment Technical Committee in the Food Safety Drug Administration, Uttar Pradesh

- Life-Member, Indian Society for Mass Spectrometry (ISMAS)

Dr. Prem N Yadav

- Life Time Member, Indian Academy of Neurosciences
- Life Time Member, Indian Pharmacological Society
- Life Time Member, Indian Immunological Society

Dr. T. Narender

- Member, Think Tank on Phytopharmaceuticals Committee of Indian Pharmacopoeia Commission (IPC), Ghaziabad
- Member, Ashwagandha-Related Issues Committee, Ministry of AYUSH, New Delhi

Dr. Aamir Nazir

- Fellow, Indian Academy of Neurosciences, India
- Fellow, Society of Applied Biotechnology, India
- Life Member and Treasurer, Lucknow Branch, Indian Academy of Neurosciences
- Life Member, Society of Toxicology, India
- Life Member, Society of Biological Chemists, India
- Life Member, Indian Society of Cell Biology
- Life Member, Laboratory Animal Science Association of India
- Life Member, Society of Alternatives to Animal Experiments, India
- Life Member, Environmental Mutagen Society of India

Dr. Kalyan Mitra

- Life Member, The Electron Microscopy Society of India

Dr. Jiaur R. Gayen

- Life-Member, Association of Biotechnology and Pharmacy, India
- Life-Member, Indian Society for Mass Spectrometry
- Life-Member, Indian Pharmacological Society
- Life-Member, Society of Biological Chemists, India
- Life-Member, Indian Science Congress Association
- Life-Member, Laboratory Animal Science Association of India
- Life-Member, Society of Applied Biotechnology, India

Dr. Mrigank Srivastava

- Treasurer, Indian Society of Parasitology
- Life Member, Indian Society of Parasitology (Membership No. 763)
- Life Member, Indian Immunology Society (Membership No LM/IIS/118/03/11)
- Life Member, Indian Society of Cell Biology (Membership No. 2014010)
- Member, Executive Committee, Society for Integrative Biosciences, JNU, New Delhi (Membership No LM 009)
- Life Member, The Cytometry Society of India (Membership No L-1393)
- Life Member, International Society for Advancement of Cytometry (ISAC) (Membership No. 65705048)

Dr. Sarika Singh

- Life-Member of National Academy of Sciences, India
- Life-Member of National Academy of Biological Sciences
- Life-Member of Society of Toxicology, India
- Life-Member of Indian Academy of Neurosciences
- Life-Member of Indian Society of Cell Biology
- Life-Member of National Environmental Science Academy
- Life-Member of Indian Society of Chemists and Biologists
- Associate Member of Movement Disorder Society of India (Non-Medical)

Dr. Rajesh K Jha

- Member, Indian Society for the Study of Reproduction and Fertility (ISSRF), University of Rajasthan, Jaipur
- Member, Laboratory Animal Science Association of India, CDRI, Lucknow
- Member, National Population Stabilization Fund (Janasankhya Sthirata Kosh), MH and FW, New Delhi
- Member, Society for Reproductive Biology and Comparative Endocrinology [SRBCE], Dr. ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Taramani Campus, Chennai

Dr. Akhilesh Tamrakar

- Life Member of the Society of Biological Chemist, India

Dr. Vivek Vidydhar Bhosale

- Member, Medical Council of India (MCI): Reg. No. 2602
- Life Member, Indian Pharmacological Society
- Life Member, Indian Society of Clinical Research

Dr. Madhav Nilakanth Mugale

- Member, Veterinary Council of India (VCI): Reg. No. 3535
- Member, Indian Association of Veterinary Pathologists (IAVP): Reg. No. IAVP/ M-81/ 2011
- Member, Maharashtra state Veterinary council (M.S.V.C.): Reg. No. 8313
- Member, Society of Toxicology of India (STPI): Reg. No.1234
- Member, Laboratory Animal Science Association (LASA): Reg. No. 587
- Member, Laboratory Animal Science Association of India (LASAI): Reg. No. L- 766
- Member, Society For Alternatives To Animal Experiments (SAAE): Reg. No. L- 085

Dr. Mukesh Pasupuleti

- Honorary Associate Editor, Indian Journal of Medical Research, Official journal of Indian Council for Medical Research, New Delhi, India

Dr. Arun Kumar Trivedi

- Member, External Expert in IBSC committee of IITR, Lucknow
- Member, External Expert in PhD recruitment interview board of SGPGIMS, Lucknow

- Member, External Expert in Research Degree Committee, BBDU, Lucknow

Dr. Niti Kumar

- Member, CSIR Sports Promotion Board (CSIR-SPB)
- Executive Editor, BBA-Proteins and Proteomics (Elsevier)

Dr. Virendrakumar M Prajapati

- Life Member, Veterinary Council of India (VCI)
- Life Member, Indian Association of Veterinary Pathologists (IAVP)
- Gujarat State Veterinary Council (G.V.C.)
- Life Member, Society of Toxicology of India (STPI)
- Executive Member, Laboratory Animal Science Association of India (LASAI)
- Life Member, Vadodara Veterinary Society
- European Register of Toxicologists (UK-ERT by Royal Society of Biology)
- AAALAC ad hoc Specialist (site visitor)

Dr. Chetan D. Meshram

- ACS Infectious Diseases Early Career Editorial Board Member (2025)

Dr. Sonia Verma

- Member, AIIMS Scientists Association (ASA)
- Member, Indian society for histocompatibility & Immunogenetics (ISHI)
- Member, Indian Academy of Neurosciences (IAN)

Dr. Neeraj Jain

- Associate International Member, American Society of Hematology, USA

Dr. Divya Singh

- Fellow, National Academy of Sciences
- Lifetime Member, Indian Society of Bone and Mineral Research

Dr. Rahul Shukla

- Editorial Board Member, Journal of Health Policy and Management (JHPM)

Dr. Kaushik Bhattacharjee

- Global Outreach - Contributing Member, American Society for Microbiology (ASM), USA. (since 2024)
- Life Member, Association of Microbiologists of India, India. (since 2016)
- Life Member, Assam Science Society, Guwahati, India. (since 2016)
- Editorial Board Member, Algerian Journal of Engineering and Technology (AJET). (since 2016)
- Editorial Board Member, Algerian Journal of Chemical Engineering (AJCE). (since 2017)
- Editorial Board Member, Frontiers in Microbiology. (since 2024)
- Member, International Natural Product Sciences Taskforce (INPST). (since 2016)

Dr. Satish Mishra

- Secretary, Indian Society for Parasitology

Dr. Suresh K Kalangi

- Life Member, American Association for Cancer Research (AACR), USA
- Life Member, Indian Association for Cancer Research (IACR), India
- Life Member, Indian Society of Nanomedicine (ISNM), India
- Member, The International Society of Oncology and Biomarkers (ISOBM), UK
- Life Member, The Indian Society for Parasitology (ISP), India
- Guest Associate Editor of Frontiers in Pharmacology (Predictive Toxicology)
- Editorial member of Frontiers in Oncology
- Editorial member of Frontiers in Chemistry (Nano Sciences Section)
- Reviewer for international journals: ACS Pharmacology and Translational Science, RSC Advance, Cytokine, Cytokine plus, Medical Oncology, and Burns etc.

Dr. Monika Sachdev

- Member, Society for Frontiers in Reproduction, USA
- Member, Society for Study of Reproduction & Fertility (SSRF), USA
- Member, International Society of Transgenic Technology
- Member, Society for Mitochondrial research & medicine
- Member, Indian Society of Cell Biology
- Member, Indian Society for the Study of Reproduction and Fertility (ISSRF)
- Member, Laboratory Animal Science Association of India (LASAI)
- Member, Indian Society for Extracellular Vesicles (InSEV)

Dr. Nilanjana Majumdar

- Member, American Chemical Society
- Member, Chemical Research Society of India

Dr. Smrati Bhadauria

- Life-member, Indian Society of Cell Biology

Dr. Pintu Mandal

- Lifetime Member, Association of Carbohydrate Chemists and Technologists, India (ACCTI)
- Lifetime Member, Chemical Research Society of India (CRSI) (LM 4281)

The Staff

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Dr. Radha Rangarajan, M.S., Ph.D.

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Laxman Singh Meena, M.Sc., PhD.

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Priyanka Trivedi, M.Sc.

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Mukesh Kumar, B.Tech.

Sr. Technician (2)

Radhey Shyam Ram, Intermediate

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Principal Scientist

Dibyendu Banerjee, M.Sc., Ph.D.

Sr. Technical Officer (2)

Shyam Singh, M.Sc.

Sr. Technical Officer (1)

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Durga Prasad Mishra, M.Sc., Ph.D., *Head of the Division*

Senior Principal Scientist

Ritu Trivedi, M.Sc., Ph.D., FNASc, *In-charge, Academic Affairs Unit*

Divya Singh, M.Sc., Ph.D., FNASc

Rajender Singh, M.Sc., Ph.D.

Monika Sachdev, M.Sc., Ph.D.

Rajesh Kumar Jha, M.Sc., Ph.D.

Principal Technical Officer

Balvir Singh, M.Sc.

Sr. Technical Officer (1)

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Kamlesh Singh, M.Sc., P.G.D.I.P.R.

Jaspreet Kaur, M.Sc.

Amar Deep Lakra, M.Sc.

Sr. Stenographer

Harish Kumar Checker

Lab. Assistant

Mahesh Chandra Tewari, B.Sc.

Ram Karan, Intermediate

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Atul Goel, M.Sc., Ph.D., FASc, AVHF (Germany)

Gautam Panda, M.Sc., Ph.D., FAScT, MNASc, JSPS

T. Narender, M.Sc., Ph.D.

K. V. Sashidhara, M.Sc., Ph.D., *Supervising Scientist In-charge, SAIF*

Senior Principal Scientist

Prem Prakash Yadav, M.Sc., Ph.D.

Dipankar Koley, M.Sc., Ph.D.

Kishor Mohanan, M.Sc., Ph.D.

Pintu Kumar Mandal, M.Sc., Ph.D.

Asif Ali, M.Sc., Ph.D.

Principal Scientist

Ranvir Singh, M.Tech., *Unit In-charge, Centralized Utility Services*

Ajay Kumar Srivastava, M.Sc., Ph.D.

Ravindra Kumar, M.Sc., Ph.D.

Namrata Rastogi, M.Sc., Ph.D.

Richa Pandey, M.Sc., Ph.D.

Nilanjana Majumdar, M.Sc., Ph.D.

Senior Scientist

Kinshuk Raj Srivastava, PhD

Malleswara Rao Kuram, M.Sc., Ph.D.

Damodara Reddy N., M.Sc., Ph.D.

Chandra Bhushan Tripathi, M.Sc., Ph.D.

Nayan Ghosh, M.Sc., Ph.D.

Valmik Shinde, M.Sc., Ph.D.

Ramesh Chintakunta, M.Sc., Ph.D.

Satish Kumar Mudedla, M.Sc., Ph.D., *(Joined on 9.1.2025)*

Scientist

Gorakhnath Rajaram Jachak, M.Sc., Ph.D., *(Joined on 14.11.2024)*

Satish Chandra Philkhana, M.Sc., Ph.D., *(Joined on 17.12.2024)*

Principal Technical Officer

Deepali Pandey, B.Sc., *(Superannuated on 31.5.2024)*

Sr. Technical Officer (2)

K. S. Anil Kumar, M.Sc., Ph.D., P.G.D.C.A.

Atma Prakash Dwivedi, M.Sc

Ashok Kumar Sharma, B.Sc., D.Ch.E., A.M.I.E.

Tahseen Akhtar, M.Sc., Ph.D.

Suriya Pratap Singh, M.Sc., Ph.D.

Sr. Technical Officer (1)

Shiv Ram Mishra, B. Tech (M.E.), *Centralized Utility Services*

Technical Assistant

Jitendra Singh, M.Sc.

Bhawana Sharma, Ph.D.

Sr. Technician (3)

S. C. Tiwari, B.Sc., *(Superannuated on 30.6.2024)*

Manju, B.Sc.

Sr. Technician (2)

Ram Lakhan, Intermediate

Sr. Technician (1)

Rajesh Kumar Verma, B.Sc

Technician (2)

Kul Bahadur Thapa, BCA, ITI Trade Electronics, Diploma (Electronics)

Lab Assistant (2)

J. C. Rajan, *(Superannuated on 30.6.2024)*

Mohd. Islam, *(Superannuated on 31.7.2024)*

DIVISION OF MOLECULAR MICROBIOLOGY AND IMMUNOLOGY

Chief Scientist

B. N. Singh, M.Sc., Ph.D., *Head of the Division*

Sr. Principal Scientist

Y. K. Manju, M.Sc., Ph.D.

Arunava Dasgupta, M.Sc., Ph.D.

Satish Mishra, M.Sc., Ph.D.

Sudheer Kumar Singh, M.Sc., M.Tech., Ph.D.

Sidharth Chopra, M.Sc., Ph.D.

Mukesh Pasupuleti, M.Sc, Ph.D.

Principal Scientist

Mrigank Srivastava, M.Sc., Ph.D.

Niti Kumar, M.Sc., Ph.D.

Senior Scientist

Bidyut Purkait, M.Sc., Ph.D.

Mohammad Zeeshan, M.Sc., Ph.D., *(Joined on 28.2.2025)*

Scientist

Suresh Kumar Kalangi, M.Sc., Ph.D.

Prem Prakash, M.Sc., Ph.D, *(Joined on 28.2.2025)*

Principal Technical Officer

Rishi Narayan Lal, M.Sc.

Sr. Technical Officer (3)

Sandeep Kumar Sharma, M.Sc., Ph.D

Sr. Technical Officer (1)

Shikha Mishra, M.Sc.

Ashan Manhas, B.Sc ,DMLT, M.Sc.

Atul Krishna, B.Sc., DMLT, M.Sc.

Umamageswaran V., M.Sc., Pot M.Sc. (ADMD)

Technical Assistant

Shabeer Ali H., M.Sc., PhD.

Lab Assistant

Ravi Shankar Mishra, *(Superannuated on 30.6.2024)*

Ram Prakash, B.A.

Shyam Sunder Yadav, B.A.

Lab Attendant (2)

Ram Das

DIVISION OF NEUROSCIENCE AND AGEING BIOLOGY

Senior Principal Scientist

Prem N. Yadav, M.Sc., Ph.D., Head of the Division

Principal Scientist

Shubha Shukla, M.Sc., Ph.D.

Senior Scientist

Aravind Singh Kshatri, M.Sc., Ph.D.

Scientist

Sonia Verma, M.Sc., Ph.D.

Sr. Technical Officer (2)

Sachi Bharti, M.Sc.

Sr. Technical Officer (1)

Deepmala, M.Sc.

Private Secretary

Renuka Mushran, B.A., *(Superannuated on 31.1.2025)*

DIVISION OF PHARMACEUTICS AND PHARMACOKINETICS

Chief Scientist

Amit Misra, M. Pharm., Ph.D.

Prabhat Ranjan Mishra, M. Pharm., Ph.D., FNASc, *Head of the Division*

Senior Principal Scientist

Manish Kumar Chourasia, M. Pharm., Ph.D.

Rabi Sankar Bhatta, M. Pharm., Ph.D.

Jiaur Rahaman Gayen, M. Pharm., Ph.D.

Senior scientist

Varun Kushwah, M.Pharm., Ph.D., *(Joined on 13.11.2024)*

Pr. Technical Officer

A. S. Kushwaha, B.Sc.

Sr. Technical Officer (2)

Kavita Singh, M.Sc., Ph.D.

Sr. Technical Officer (1)

Deepak, M.Sc.

S. Mehazabeen, M.Sc.

Technical Officer (1)

Sonia Verma, *(Joined on 10-5-2024)*

Abinash Chand Bharati, *(Joined on 07-6-2024)*

Dineshkumar R, (Joined on 16.02.2024)

Sr. Technician (3)

Narendra Kumar, B.Sc.

Lab Assistant

Ram Kumar

Chandramani

Ram Bhajan Shukla

DIVISION OF PHARMACOLOGY

Chief Scientist

Manoj Kumar Barthwal, M.Sc., Ph.D., *Head of the Division*

Senior Principal Scientist

Anil N Gaikwad, M.S. (Pharma.), Ph.D.

Kumaravelu Jagavelu, M.Sc., Ph.D.

Kashif Hanif, M.Sc., Ph.D.

Principal Scientist

Sachin Kumar, M.Sc., Ph.D.

Amit Lahiri, M.Sc., Ph.D.

Senior Scientist

Baisakhi Mohrana, M.V.Sc., Ph.D.

Shashi Kumar Gupta, M.Sc., Ph.D.

Principal Technical Officer

C. P. Pandey, M.Sc., Ph.D., M.H.R., *(Superannuated on 31.6.2024)*

Sr. Technical Officer (2)

Sheeba Saji Samuel, M.Sc., Ph.D.

Sr. Technical Officer (1)

Smriti, M.Sc.

Pankaj Kumar Shukla, B.Sc., P.G.D.B.T.

Sr. Technician (3)

Ramesh Chandra, M.Sc., *(Superannuated on 30.9.2024)*

Anil Kumar Verma, B.Sc.

Personal Secretary

Atul Srivastava, B.A.

DIVISION OF TOXICOLOGY & EXPERIMENTAL MEDICINE

Chief Scientist

S. K. Rath, M.Sc., Ph.D., *Head of the Division*

Senior Principal Scientist

Aamir Nazir, M.Sc., Ph.D.

Smrati Bhadauria, M.Sc., Ph.D.

Sarika Singh, M.Sc., Ph.D.

Principal Scientist

Vivek Vidyadhar Bhosale, M.B.B.S., M.D.

Madhav Nilakanth Mugale, M.V.Sc., Ph.D.

Senior Scientist

Virendrakumar Prajapati, M.V.Sc, ERT

Neha Topno, M.Sc.

Ashish Awasthi, M.Sc., Ph.D.

Senior Technical Officer (2)

Anurag Kumar Srivastava, M.Sc.

Shail Singh, M.Sc., Ph.D.

Senior Technical Officer (1)

Anil Kumar Meena, M.Sc., B.Ed.

Navodayam Kalleti, M.Sc.

Technical Officer

Sudhaker Yadav, M.Sc., M.L.T.

Technical Assistant

Akhilesh Kumar, M.Sc., Ph.D.

Sr. Technician (3)

Anupma, B.Sc. *(Superannuated on 31.5.2024)*

Lab Assistant

Umesh Kumar, Intermediate

Ram Kumar, High School (Science)

DIVISION OF VIROLOGY

Senior Principal Scientist

Raj Kamal Tripathi, M.Sc., Ph.D., Head of the Division

Senior Scientist

Chetan Meshram, Ph.D.

Scientist

Rahul Shukla, Ph.D.

NATIONAL LABORATORY ANIMALS CENTRE

Senior Principal Scientist

Dhananjoy Hansda, M.V.Sc.

S. Rajakumar, M.Sc

Principal Scientist

Rajdeep Guha, M.V.Sc., Ph.D., *Scientist-In-Charge*

Senior Scientist

Shishir Kumar Gupta, M.V.Sc., Ph.D.

Senior Technical Officer

Chandra Shekhar Yadav, M.Sc., PGDCA., Ph.D.

Zaheeb Rasheed Wani, M.V.Sc.

Technical Assistant

Vijay Kumar Verma, M.Sc., Ph.D.

Sr. Technician (3)

Shaiendra Mohan, M.Sc., PGDCA

Sanjeev Kumar Saxena, B.Sc.

Sr. Technician (2)

Ravi Kumar Shukla, Intermediate (Sci.)

Narendra Kumar, B.A.

Dinesh Kumar, B.A.

Pradeep Tirkey, Intermediate

Sr. Stenogrpaher

Surendra Kumar, B.Com.

Lab Assistant

Najibullah, *(Superannuated on 31.8.2024)*

SOPHISTICATED ANALYTICAL INSTRUMENT FACILITY AND RESEARCH

Senior Principal Scientist

Kalyan Mitra, M.Sc., Ph.D., *Unit In-charge, Electron Microscopy*

Sanjeev Kumar Shukla, M.Sc., Ph.D., *Unit In-charge,* NMR

Manoj Kumar Rawat, M.Tech., *Unit In-charge, Instrumentation*

Sanjeev Kanojiya, M.Sc., Ph.D., *Unit In-charge, Mass Spectrometry*

D. K. Mishra, M.Sc., Ph.D., *Unit In-charge, Botany*

Principal Scientist

Vineeta Tripathi, M.Sc., Ph.D.

Santosh Kumar, M.Sc., Ph.D.

Senior scientist

Vineeta Rai, M.Sc., Ph.D., *(Joined on 09.09.2024)*

Principal Technical Officer

H. M. Gauniyal, M.Sc., Ph.D., *(Superannuated on 31.1.2025)*

Sr. Technical Officer (3)

Ram Karan Harijan, AMIE (Instrumentation)

Sanjay Kumar, M.Tech. (Instrumentation)

Sr. Technical Officer (2)

Binod Kumar Saw, M.Sc.

Sr. Technical Officer (1)

Garima Pant, M.Sc.

Amit Kumar, M.Tech.

Dharmesh Kumar, M.Sc.

Pooja Soni, M.Tech.

Tofan Kumar Rout, M.Sc., Ph.D.

Jeevan Prakash Pandey, Diploma in Electronics

Ajay Kumar, B.Sc., Dip. in Elec. Engg.

Technical Officer

Chandra Pal Singh, *(Joined wef 1.1.2025)*

Amol Bisen, M.Sc. (Pharm), Ph.D.

Technical Assistant

Vipin Kumar, M.Sc., PhD

Pooja Singh, M.Sc.

Mohan Kumar A.S., M.Sc.

Guru Dayal, M.Sc., Ph.D., *(Joined on 28.10.2024)*

Sr. Technician (3)

S. A. Singh, B.Sc., PGDCA

J. K. Joshi, B.Sc. *(Superannuated on 30.6.2024)*

Sr. Technician (2)

O. P. Gupta, B.Sc.

Technician (2)

Susheel Kumar, Intermediate (Skill Development)

Sumit Khichi, ITI, BCA (Auditorium)

Lab Assistant

R. C. Maurya

Lakhana Devi

Ashok Kumar

KNOWLEDGE RESOURCE CENTRE

Senior Technical Officer (2)

Ramesh Chandra Gupta, *M.L.I.Sc*

Senior Technical Officer

Pankaj Upreti, *M.L.I.Sc*

SCIENTIFIC DIRECTORATE

Senior Principal Scientist

Anand P. Kulkarni, M.Sc., Ph.D., *Head PME, In-charge, KRC*

Scientist

Shruthi R. Raju, M.Sc., Ph.D.

Principal Technical Officer

Ravindranath S. Londhe, GD Art (Commercial), Art Teachers Dip.

Sr. Technical Officer (1)

Arbind Kumar, B.C.A., PGDAM

Farha Khan, B.C.A, M.C.A.

Ashok Kumar, Diploma in Mechanical Engineering

Technician (1)

Abhinav Kumar Sharma, Intermediate, ITI *(Joined wef 10.3.2025)*

Sr. Stenographer

Himanshu Upadhyay, B.A.

ACADEMIC AFFAIRS UNIT

Principal Scientist

Sanjeev Yadav, M.Sc., Ph.D., PG Diploma in Bioinformatics

Scientist

Hijas KM, M.Sc., Ph.D.

Technician (1)

Neha Singh, *(Joined on 5.3.2025)*

BUSINESS DEVELOPMENT & INTELLECTUAL PROPERTY UNIT

Senior Principal Scientist

Naseem Ahmed Siddiqui, B. Pharm (Hons), M.B.A., Ph.D., *Head-BD*

Sripathi Rao Kulkarni, M.Sc., Ph.D., P.G. Dip. in Patents Law (transferred to CSIR-Hq.)

Scientist

Kaushik Bhattacharjee, M.Sc., Ph.D.

Suresh Kumar Battina, M.Sc., Ph.D., *(Joined on 6.3.2025)*

Sr. Technical Officer (2)

Jai Prakash Dwivedi, BTech, MBA

Senior Technical Officer

Neelima Srivastava, M.C.A.

Technical Officer

Shraddha Jain, MBA

Technician (1)

Sawan Kumar, *(Joined on 11.3.2025)*

COMPUTER CENTRE

Chief Scientist

Kural, B.E., *In-Charge*

Scientist

Santosh Shukla, B.Tech.

Senior Technical Officer

Ajay Kumar Maurya, M.Tech.

Technical Officer

Rati Kumari, *(Joined on 27.05.2024)*

Mohammad Zubair Nizami, *(Joined on 14.08.2024)*

LABORATORY ENGINEERING SERVICES

Senior Superintending Engineer

Er Kamal Jain, B.E., In-charge, Electrical Section

Superintending Engineer

Er Mohit Kumar Shukla, A.M.I.C.E. In-charge, Civil section

Er Jai Prakash, Diploma in Mech. Engg. (Ref. & AC)

Er Sidho Hembrom, B.Tech. (Mechanical)

Executive Engineer

Er D. K. Vishwakarma, Diploma in Civil Engg.

Er Brahma Singh, AMIE in Electrical Engg.

Assistant Engineer

Er Madhukar Saroj, Diploma, B.Tech. (Civil)

Sr. Stenographer (Hindi)

Raj Kumar, B.A.

Multitasking Staff

Hanuman

Maikulal-II

Sr. Technician (2)

Harish Kumar, Intermediate, ITI *(Superannuated on 30.11.2024)*

Swapan Karmi

Lab Assistant

S. K. Bhattacharya

Darshan Lal

Suresh Kumar

Lab Attendant (2)

Sandeep Roy, *(Superannuated on 31.12.2023)*

Dhirendra Misra, Intermediate

Mohd. Irfan, Intermediate, ITI

Raju Vishwakarma

Hari Om Garg

Gaya Prasad, *(Superannuated on 31.10.2024)*

Ram Asrey

Multi-Tasking Staff

Faizi

GENERAL ADMINISTRATION

SR. COA OFFICE

Sr. Controller of Administration

Bhaskar Jyoti Deuri

Administrative Officer

Rashmi Rathore

Nitu Kumari

Prabha Tirkey, *(Joined on 18.9.2024)*

Asstt. Section Officer (G)

Kamla Kandpal, M.A.

Sr. Stenographer

Kshma Bajpai, B.A.

Multi-Tasking Staff

Ravi Kanojiya

Ravi Kumar Sonker

DIRECTOR'S OFFICE

Principal Private Secretary

Sumit Srivastava, B.Com.

Private Secretary

V. P. Singh, B.A.

Lab. Attendant (2)

Nand Kishore Manjhi, ITI

Multi-Tasking Staff

Rajesh

ESTABLISHMENT I

Section Officer (G)

Sibtain Jafar, *(Joined on 26.3.2025)*

Assistant Section Officer (G)

Jagdish Prasad, B.Sc., MPA

Saju P. Nair

Saurabh, *(Joined on 18.3.2025)*

Amit Kumar Singh, *(Joined on 19.3.2025)*

Anjali Singh, B.A.

Sr. Stenographer

Deepak Dhawan, B.A

Junior Secretariat Assistant

Shailja Bahal

Abhishek Kashyap

Lab Assistant

Vinod Kumar

Lab Attendant (1)

Nidhi Srivastava

Multi-Tasking Staff

Mohammad Haroon

ESTABLISHMENT II

Section Officer (G)

Sanyogita Sanger, *(Joined on 12.3.2025)*

Vibhash Kumar, BA (Hons., CIC), *(Transferred to NBRI)*

Assistant Section Officer (G)

Dilip Kumar Sen, B.Com. *(Superannuated on 30.9.2024)*

Neena Raizada, B.A.

Ajai Shukla, M.Com.

Vijay Kumar Bhartey, B.A.

Anoop Thakur, B.Tech. (ECE) O-level

Akshay Mishra, *(Joined on 19.3.2025)*

Ravi Rana, (Joined on 24.3.2025)

Senior Secretariat Assistant (G)

Vinay Kumar Singh, B.C.A.

Jr. Stenographer

Shivam Verma

GENERAL SECTION

Section Officer (G)

K K Saxena

Assistant Section Officer (G)

Rani, High School, *(Superannuated on 31.5.2024)*

Neelesh Kumar Jareda, *(Joined on 21.3.2025)*

Senior Secretariat Assistant (G)

Deepak Kumar Gupta, M.Com. *(Transfer to CSIR Hq)*

Rishi Kant, M.Sc., B.Ed., O-Level *(Transfar to CSIR-CRRI)*

Mohd. Saleem, Prathama

Kalpanath Sharma, Intermediate

Junior Secretariat Assistant

Bhupendra Kumar

Shekhar Singh, B.Com., M.B.A.

Ashutosh Chaudhary

Saurav Sarkar, Intermediate

Private Secretary

Seema Srivastava, M.A. *(Superannuated on 31.12.2024)*

Sr. Technician (2)

Vivek Kumar Mishra

Driver

Sumit Arya, *(Joined on 11.12.2024)*

Aman, *(Joined on 20.3.2025)*

Sanjay, *(Joined on 18.9.2024)*

Aman Kumar Singh, *(Joined 20.03.2025)*

Lab Attendent (2)

K. P. Mishra, High school

BILL SECTION

Section Officer (G)

Vivek Bajpai

Assistant Section officer

Nida Parveen, B.Com.

Senior Secretariat Assistant (G)

Indra Prakash Singh, B.A., *(Transferred to CSIR Hqtrs)*

Kumar Saurabh, B.Com., *(Transferred to CSIR Hqtrs)*

Junior Secretariat Assistant

Harshita Maheshwari

Sr. Stenographer

Vineet Pandey, B.A., P.G. Comp.

Lalit Kumar, B.A.

Lab. Assistant (2)

Vinod Kumar Sharma, B.A.

Multi-Tasking Staff

Chabbi Lal Thapa, *(Joined on. 31.07.2024)*

VIGILANCE

Assistant Section Officer (G)

Jaya Singh, B.Sc.

Junior Secretariat Assistant (VIGILANCE)

Aastha

Lab. Assistant

Ramesh Chandra, *(Superannuated on 31.12.2024)*

HINDI SECTION

Hindi Officer

Sachin Mishra

Hindi Translator

Bihari Kumar

Private Secretary

Anil Kumar, B.Com.

SECURITY

Security Officer

Anil Kumar Upadhyay, M.A.

FINANCE & ACCOUNTS

Controller of Finance & Accounts

Sanjeev Shekhar, M.A., M.B.A.

Finance & Accounts Officer

Dharmraj

Prasoon Mishra

Section Officer (F&A)

Gitendra Kumar Gupta

Niraj Kumar

Amit Kumar Mishra, *(Joined on 30.08.2024)*

Assistant Section Officer (F&A)

Ajay Kumar

Preeti Gangwar

Sanjay Kumar

Chandrashekhar

Senior Secretariat Assistant (F&A)

Abhishek Kumar

Mamata Chourasia

Mohd. Firoz

Junior Secretariat Assistant (F&A)

Satyam Tiwari

Harshit Mishra

Raman Kumar

Sudhir Kumar Yadav

Sr. Stenographer (H) (MACP)

Mohammad Sufiyan

Lab. Attendant (2)

Vikramaditya

Lab. Assistant

Satish Chandra Yadav

Multi-Tasking Staff

Sudhir Kumar Yadav

STORES & PURCHASE

Controller Store & Purchase

Vinay Kumar, PG

Store & Purchase Officer

Neelambuj Shanker Prasad, M.Com., M.B.A.

G S Verma, AMIE, M.B.A.

Section Officer

Govind Kumar Jha, MBA

Assistant Section Officer (S&P)

Mahesh Kumar, M.A.

Manglik Anand, *(Joined on 17.3.2025)*

Anil Kumar Dudi, *(Joined on 20.3.2025)*

M. C. Verma, B.Com. *(Superannuated on 30.4.2024)*

Mayank Mishra, *(Joined on 23.8.2024)*

Senior Secretariat Assistant (S&P)

Kanchan Bala, B.A., *(Superannuated on 31.10.2024)*

G. P. Tripathi, Intermediate

Ram Kumar, B.Com.

Junior Secretariat Assistant (S&P)

Ambica Bhawani Vaka

Satyam Rathour

Naveen

Dileep Singh

Sr. Technician (2)

Ravi Kumar Mehra, B.A., *(Superannuated on 31.05.2024)*

Private Secretary

Vinod Kumar Yadav, BA

CSIR DISPENSARY

Medical Officer Group III (5) / STO-II

Dr. (Maj) Kunal Gupta, M.B.B.S., *In-Charge*

Medical Officer Group III (4) / STO-I

Dr. (Lt Col) Shalini Gupta, M.B.B.S., PGDHHM

Dr. Saurav Kumar KC, M.B.B.S., Medical Officer

Dr. Pradeep Singh, M.B.B.S., Medical Officer

Sr. Technician (1)

Shraddha, M.A., Diploma in Nursing, Post Basic Diploma in Dialysis, Certificate in Child Care Nutrition

Technician (1)

Shahzada Jalal B.Sc., D.Pharm (Pharmacist)

Simpi Gupta, D.Pharm (Pharmacist)

Lab. Attendant (2)

Shubhendra Kumar, Intermediate

CANTEEN

Clerk (ACP)

Y.K. Singh, B.A. (Count C), *(Superannuated on 31.5.2024)*

Asstt. Halwai

Uma Shankar

S/Man

Raj Kumar, *(Superannuated on 30.11.2024)*

Wash Boys

Ram Murat

Dinesh Pal Singh, *(Superannuated on 30.9.2024)*

Bearer

Ganga Ram Yadav, *(Superannuated on 30.6.2024)*

Note

Note

Zydus Lifesciences, CSIR-CDRI Partner To Develop Drug For Osteoporosis

Chronic kidney disease

जीएलपी अध्ययन एवं आईएनडी प्रस्तुतीकरण संबंधी आवश्यकताओं पर सीएसआईआर-सीडीआरआई में हुआ संगोष्ठी का आयोजन

वैचारिक तूफान,संवाददाता।

लखनऊ। सीएसआईआर-सेंट्रल ड्रग रिसर्च इंस्टीट्यूट (सीडीआरआई), लखनऊ ने गुड लेबोरेटरी प्रैक्टिस (जीएलपी) अध्ययनों एवं इन्वेस्टिगेशनल न्यू ड्रग (आईएनडी) प्रस्तुत करने संबंधी जरूरतों पर प्रकाश डालते हुए एक दिवसीय संगोष्ठी का आयोजन किया। सीएसआईआर-सीडीआरआई में आयोजित संगोष्ठी में संबन्धित क्षेत्र के मुख्य वैज्ञानिक डॉ. शरद शर्मा, जो इस संगोष्ठी में सीडीआरआई के मुख्य वैज्ञानिक रहे हैं, को सम्मानित किया गया। सीडीआरआई के निदेशक डॉ. राधारंग सम्मानित विशेषज्ञों का स्वागत करते हुए किया गया। इस संगोष्ठी में सीडीआरआई के मुख्य वैज्ञानिक डॉ. शरद शर्मा, जो इस महीने सेवानिवृत्त हो रहे हैं, को सम्मानित किया गया। सीडीआरआई के निदेशक डॉ. राधारंग सम्मानित विशेषज्ञों का स्वागत भाषण में संस्थान में महत्वपूर्ण योगदान

उन्होंने बताया की रेगुलेटरी इंक्वायरी को प्रभावी बनाने के लिए डाटा का व्यवस्थित रखरखाव एवं नियमित आंकलन किसी भी जीएलपी स्टडी की मूलभूत आवश्यकता है। डॉ. जोसेफ ने शोधकर्ताओं को नियामक

भारतीय फार्मास्युटिकल क्षेत्र एवं परीक्षण सुविधाओं में विदेशी प्रायोजकों का बढ़ रहा है विश्वास : डॉ. एकता कपूर

प्रहरी मीमांसा संवाददाता

लखनऊ। सीएसआईआर-सेंट्रल ड्रग रिसर्च इंस्टीट्यूट (सीडीआरआई), लखनऊ ने गुड लेबोरेटरी प्रैक्टिस (जीएलपी) अध्ययनों एवं इन्वेस्टिगेशनल न्यू ड्रग (आईएनडी) प्रस्तुत करने संबंधी जरूरतों पर प्रकाश डालते हुए एक दिवसीय संगोष्ठी का आयोजन किया। सीएसआईआर-सीडीआरआई में आयोजित संगोष्ठी में संबन्धित क्षेत्र के मुख्य वैज्ञानिक डॉ. शरद शर्मा, जो इस महीने सेवानिवृत्त हो रहे हैं, को सम्मानित किया गया। सीडीआरआई के निदेशक डॉ. राधारंग सम्मानित विशेषज्ञों का स्वागत किया गया। इस संगोष्ठी में सीडीआरआई के मुख्य वैज्ञानिक डॉ. शरद शर्मा, जो इस महीने सेवानिवृत्त हो रहे हैं, को सम्मानित किया गया। सीडीआरआई के निदेशक डॉ. राधारंग सम्मानित विशेषज्ञों का स्वागत भाषण में संस्थान में महत्वपूर्ण योगदान

शामिल थे। डॉ सेबास्टियन जोसेफ ने आईएनडी-सक्षम प्रीक्लिनिकल अध्ययनों के कस्टमाइजेशन (अनुकूलन) के महत्व पर जोर दिया। उन्होंने बताया की रेगुलेटरी इंक्वायरी को प्रभावी बनाने के लिए डाटा का व्यवस्थित रखरखाव एवं नियमित आंकलन किसी भी जीएलपी स्टडी की मूलभूत आवश्यकता है। डॉ. जोसेफ ने शोधकर्ताओं को नियामक अधिकारियों द्वारा उठाए जाने वाले सभी प्रासंगिक प्रश्नों का पूर्वानुमान लगाने और उनके समाधान के लिए तैयार रहने की आवश्यकता पर भी बल दिया जो जीएलपी अध्ययन का एक प्रमुख घटक है। डॉ. मंथन डी जानोदिया

सीएसआईआर-सीडीआरआई में अंतर्राष्ट्रीय महिला दिवस-2024 समारोह

सीएसआईआर-सीडीआरआई में एक महीने चलने वाले अंतर्राष्ट्रीय महिला दिवस समारोह के अंतर्गत होंगे अनेक कार्यक्रम

समानता सम्मान एवं सशक्तिकरण के लिए दौड़े वैज्ञानिक व शोध छ

लखनऊ (एसएनबी)। केन्द्रीय औषधि अनुसंधान संस्थान (सीडीआरआई) में अंतर्राष्ट्रीय महिला दिवस के उपलक्ष्य में अनेक कार्यक्रम आयोजित किए जा रहे हैं। इसके अन्तर्गत शारीरिक फिटनेस को अपनाने संकल्प के साथ शैक्षणिक आकांक्षाओं क लिए प्रेरित करने के साथ-साथ समानता, सशक्तिकरण के लिए संस्थान में मंगलवार क का आयोजन किया गया, जिसमें सभी वैज्ञानि छात्रों ने दौड़ लगायी। संस्थान की निदेशक डा. दिखाकर रवाना किया। इस अवसर पर उन्होंने व

Technology transfers, exhibi mark National Science Day

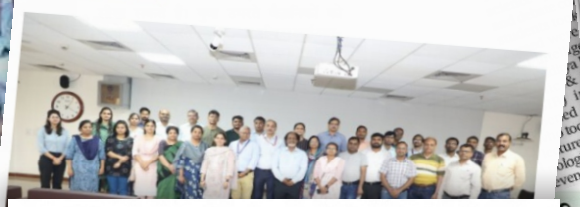
A science exhibition underway at C on 'technology transfer' held at C

LUCKNOW: Home to over 20 national scientific and research institutions, Lucknow marked National Science Day with great zeal. While schoolchildren in numbers flocked to the Science City in Aliganj, scholars and exhibi- various insti-

thalmic formulation for fungal keratitis to Cipla Limited. 'This formulation of antifungal drug to optimise its delivery in t preclinical studies, eye. In preclinical studies, ation supports faster fection. ble up the required atory ap lisation. or those Radh stitute ligenco ion o

पेटेंट आवेदनों की जटिलताओं से निपटने के लिए मिली बहुमूल्य सीख

By National News Vision - April 26, 2024



थीम के साथ सीएसआईआर–सीडीआरआई ने उत्साह एवं उमंग के साथ मनाया 10वां अंतर्राष्ट्रीय योग दिवस

खबरों का दंगल

लखनऊ। सीएसआईआर-सेंट्रल ड्रग रिसर्च इंस्टीट्यूट लखनऊ ने 10वां अंतर्राष्ट्रीय योग दिवस बड़े उत्साह के साथ मनाया। संस्थान के वैज्ञानिकों, छात्रों और स्टाफ सदस्यों ने इस कार्यक्रम में सक्रिय रूप से भाग लिया और शारीरिक और मानसिक कल्याण को बढ़ावा देने वाली विभिन्न योग क्रियाओं के प्रातःकालीन सत्र में भाग लिया। जिसमें डॉ आशीष अरोरा ने योग अभ्यास करवाया एवं उसके महत्व पर प्रकाश डाला। इस अवसर

आंतों के सूजन से संबंधित रोगों पर चर्चा

विज्ञान दिवस के अवसर पर बुधवार को सीडीआरआई में निदेशक डॉ. राधारंग साथ एमओयू हुआ। -संवाद

LKO'S SCIENTIFIC COMMUNITY GEARS UP FOR THE SCIENCE DAY

LUCKNOW: Multiple scientific institutions in Lucknow are gearing up to mark National Science Day, which falls on February 28, with a number of events and lectures on their premises.

The CSIR labs in Lucknow are organising multiple events and lectures under the theme 'Indigenous Technologies for Viksit Bharat.' A lecture titled 'The Response towards the Pandemic and the Role of Science' will be delivered by Pragya Yadav, Scientist at ICMR-National Institute of Virology, Pune, at CSIR-Central Institute of Medical and Aromatic Plants, Lucknow. CSIR-CDRI is also organising a Trans-national Research Lecture Series on 'Microbiome Manipulation Therapies in Inflammatory Bowel Disease,' to be delivered by Vineet Ahuja, gastroenterology department, AIIMS, New Delhi.

विज्ञान, प्रौद्योगिकी जीवन लिए महत्वपूर्ण: डॉ. शिन्जिनी

कार्यक्रम

सीएसआईआर-सीडीआरआई ने मनाया राष्ट्रीय प्रौद्योगिकी दिवस

वैज्ञानिक बनने का मार्ग एकरेखीय नहीं है, इसमें उतार चढ़ाव, अप्रत्याशित चुनौतियाँ एवं संदेह के क्षण शामिल हैं : डॉ राधा रंगराजन

कैनविज टाइम्स संवाददाता

लखनऊ। सीएसआईआर सेंट्रल ड्रग रिसर्च इंस्टीट्यूट लखनऊ ने अपने जनवरी 2024 बैच के नए पीएचडी छात्रों का स्वागत करने के लिए एक प्रेरणा समारोह शोधारंभ का आयोजन किया। इस उत्साहपूर्ण आयोजन का उद्देश्य छात्रों को संस्थान की प्रतिष्ठित विरासत से परिचित कराने के साथ साथ उन्हें सीडीआरआई के

CDRI greets new PhD scholars with plantation drive

LUCKNOW: The new PhD Scholars of CSIR-Central Drug Research Institute joined in a green initiative 'Shodhaarambh' by planting saplings in induction ceremon plantation progra aims to instill a se environmental responsibility an consciousness ar scholars, encour them to be stew nature," said di Radha Rangara

सीडीआरआई में हिंदी पखवाड़ा समापन प हास्य रस की फुहार

By National News Vision - October 3, 2024

Centre of Excellence for Fundamental and Translation Research in Ayurveda Inaugurated at CSIR-CDRI

Lucknow: On the occasion of the 9th Ayurveda Day, CSIR-C Research Institute (CDRI) in Lucknow celebrated the inaugu new AYUSH Centre of Excellence for Fundamental and Tra Research in Ayurveda.

The Honourable Prime Minister of India launched the cen part of the nationwide inauguration of four prestigious A Excellence. The Deputy Chief Minister and Health Minis Pradesh, Shri Brajesh Pathak, graced the event and off the plaque, marking the centre's formal establishment

मौलिक एवं अनुवादात्मक अनुसंधान के लिए आयुर्वेद उत्कृष्टता केंद्र का कल सीएसआईआर-सीडीआरआई, लखनऊ में उद्घाटन किया जाएगा

सीएसआईआर-सीडीआरआई के आयुर्वेद उत्कृष्टता केंद्र के उदघाटन के अवसर पर यूपी के उपमुख्यमंत्री, प्रधानमंत्रीजी की इस पहल के साक्षी बनेंगे

लखनऊ(बरेली की आवाज)। 9वें आयुर्वेद दिवस के अवसर पर 29 अक्टूबर, 2024 को भारत के माननीय प्रधानमंत्री छह प्रतिष्ठित आयुष उत्कृष्टता केंद्रों का ऑनलाइन उद्घाटन करेंगे, जो भारत की पारंपरिक चिकित्सा के प्रति प्रतिबद्धता को आगे बढ़ाएंगे। इनमें से एक उत्कृष्टता केंद्र, सीएसआईआर-केन्द्रीय औषधि अनुसंधान संस्थान लखनऊ में प्रारम अवसर कल प्रातः 11:30 बजे उत्तर प्रदेश के उपमुख्यमंत्री श्री ब्रजेश पाठक स में उदघाटन पट्टिका के अनावरण के अवसर पर प्रधानमंत्री की इस पहल के जो आयुर्वेदिक अनुसंधान को आगे बढ़ाने में राज्य की महत्वपूर्ण भूमिका का प्रती सीडीआरआई सेंटर ऑफ एक्सीलेंस, चुनिंदा हर्बल अर्क तथा पादप-घटकों का मू के लिए आविष्कारशील अध्ययन करेगा, जिनका उद्देश्य प्रतिरक्षा कार्य, सूजन इम्यूनोमॉड्यूलेटरी गतिविधियों पर इन आयर्वेदिक लीड्स के प्रभावों को वैज्ञा सिद्ध करना होगा। इन शोध का लक्ष्य आयुर्वेदिक दवाओं के लिए मजबूत, साक्ष समर्थन प्रदान करने के लिए डिजाइन तैयार करना होगा, जिससे सीडी

CSIR-CDRI Lucknow and Zydus to develop best-in-class drug for CKD induced Osteoporosis

Under this agreement, CDRI and Zydus will jointly undertake preclinical research. Any drug cand emerging from the efforts will be developed by Zydus for India and other markets

By BioVoice Correspondent - October 1, 2024 135

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