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75 Years of CSIR Touching Lives

वार्षिक प्रतिवेदन

ANNUAL REPORT 2016-17

CSIR-Central Drug Research Institute, Lucknow

सीएसआईआर–केन्द्रीय औषधि अनुसंधान संस्थान, लखनऊ

CSIR - Central Drug Research Institute, Lucknow

CSIR-Central Drug Research Institute, Lucknow

With a strength of more than

114 multidisciplinary scientists,

>468 research fellows and >273 technical

staff, Institute is poised to make an

everlasting impact in the health

and pharma sector with

global impact.

With best compliments from

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(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्)

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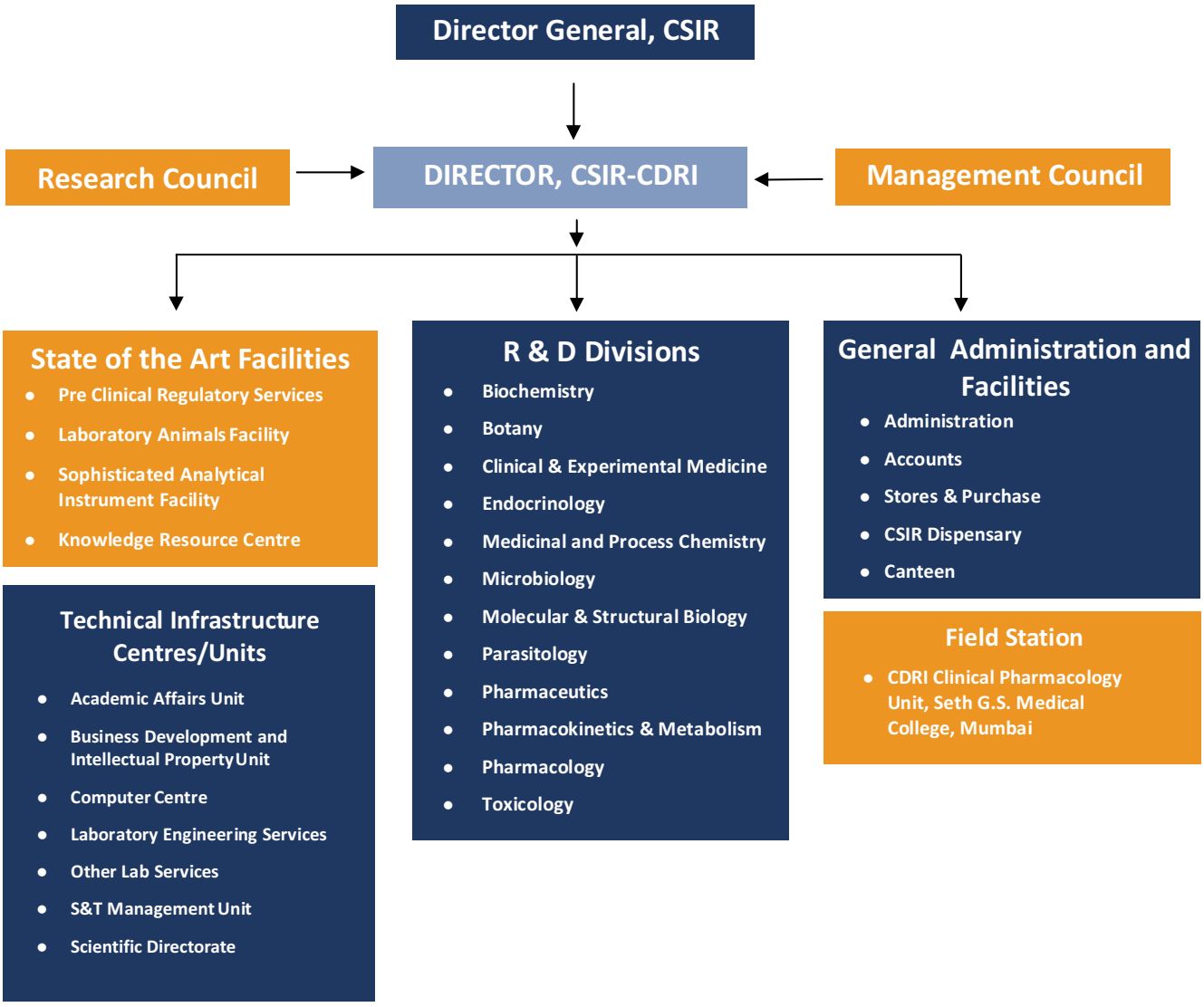
Organizational Structure



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CSIR Touching Lives

Highlights of Achievements

सीएसआईआर-केन्द्रीय औषधि अनुसंधान संस्थान, लखनऊ
स्था.1951
Estd. 1951
CSIR-Central Drug Research Institute, Lucknow

The Charter

- Development of new drugs and diagnostics;
- Cellular and molecular studies to understand disease processes and reproductive physiology;
- Development of contraceptive agents and devices;
- Systematic evaluation of medicinal properties of natural products;
- Development of technology for drugs, intermediates and biologicals;
- Dissemination of information in the field of drug research, development and production;
- Consultancy and development of technical manpower.

Thrust Areas of Research

1. **New Drug Discovery**
   - Rational design, synthesis and biological screening of synthetic compounds and natural products for discovery of new drug
   - Repositioning of bioactives
   - Maintenance of the Repository of Synthetic and pure Natural Compounds for identification of ligands for new biochemical targets
   - Recruiting compounds from other institutions for assessment of bioactivity
2. **Translational Research**
   - Pre-clinical, clinical development and commercialization of new generation affordable drugs for diseases of national importance and international relevance;
   - Creation of center of excellence in the field of Clinical trials, Regulatory toxicology, Safety pharmacology, Pharmaceutics and Pharmacokinetics & metabolism and catering to the needs of pharmaceutical industries.
3. **Basic Research Areas for Advancing the Knowledge Frontiers**

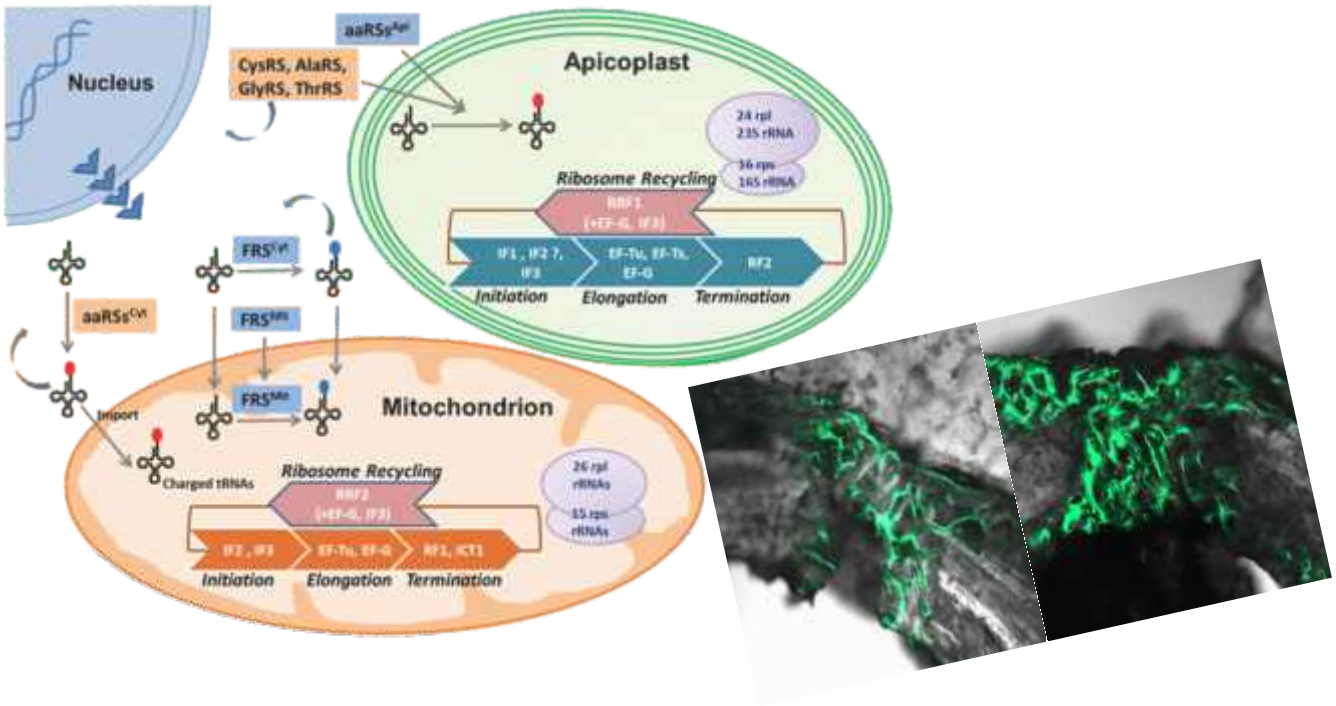
   i. Malaria and other Parasitic Diseases
   - Development of new drugs/drug combinations as therapeutic interventions for malaria, leishmaniasis and filariasis;
   - Establish novel target based drug assay protocols for identification of new leads;
   - Knowledge generation on parasite biology and host parasite interactions.

   ii. Reproductive Health Research, Diabetes and Energy Metabolism
   - Development of novel agents for fertility regulation (male/female) and management of endocrine disorders through modern drug design, scientific validation of traditional remedies and generation of new knowledge

   iii. Tuberculosis and Microbial Infections
   - Simplification and shortening of treatment for drug-sensitive tuberculosis and search of new treatments for MDR-TB
   - Development of new drugs for bacterial, fungal, viral (HIV & JEV) infections and tuberculosis.

   iv. CVS, CNS and Related Disorders
   - Development of new target based drugs to alleviate CVS, CNS and related disorders;
   - Carry out excellent basic research to delineate the molecular mechanisms of these pathologies so as to identify suitable targets for drug discovery, as well as to analyze the possible mechanism(s) of action of the candidate drugs.

   v. Cancer and Related Areas
   - Lead identification/optimization to obtain drug-like molecules.
   - Creation of appropriate platform for interdisciplinary collaborative research;
   - Creation of knowledge base in cancer biology;



Contents

अनुक्रमणिका

निदेशक की कलम से

वर्ष 2016-17 का वार्षिक प्रतिवेदन प्रस्तुत करना मेरे लिये एक महत्त्वपूर्ण अनुभव है। मुझे प्रसन्नता है कि रिपोर्टिंग अवधि के दौरान संस्थान ने अपने घोषणा पत्र के सभी पहलुओं में असाधारण उन्नति की है जिसमें औषधि खोज और विकास, ज्ञान की सरहदों को आगे बढ़ाना, मानव संसाधन विकास, बौद्धिक संपदा, सामाजिक क्रियाकलाप इत्यादि सम्मिलित हैं।

डलबर्जिया सिसू से विकसित नया हर्बल उत्पाद विपणन हेतु हमारे वार्षिक दिवस 2016 को सफलतापूर्वक लॉन्च किया गया। प्रारंभिक डेटा, बाजार में उत्पाद की स्वीकृति की ओर संकेत करते है। सीएसआईआर-सीडीआरआई के शानदार योगदान-सेन्टक्रोमान को पुनः राष्ट्रीय परिवार नियोजन कार्यक्रम में वरीयता प्राप्त गर्भनिरोधक के रूप में सम्मिलित किया गया। सेन्टक्रोमान और आर्टीथर (मलेरियारोधी औषधि हेल्थ केयर सेक्टर में सीएसआईआर के शानदार योगदानों का प्रतीक बन गए हैं। ये दोनों उत्पाद अब भारत सरकार के राष्ट्रीय कार्यक्रमों का हिस्सा हैं। अभी हाल ही में हमने ऑस्टियोपोरासिस से लड़ने एवं अस्थियों के फ्रेक्चर को शीघ्रता से ठीक करने के लिए CDRI S-008-399 की एक नई तकनीक मेसर्स आर्थोरिजेनिक्स प्रा. लि., हैदराबाद, को लाइसेंस की है। ये उपलब्धियों हमें गर्व की अनुभूति ही नहीं कराती बल्कि हमको राष्ट्र की सेवा में और अधिक शक्ति के साथ कार्य करने के लिये भरपूर प्रेरणा भी देती है।

वर्ष 2016 सर्वाधिक चुनौती भरा वर्ष रहा। वर्ष 2016 के प्रारंभ में ही बदलती हुई राष्ट्रीय प्राथमिकताओं के अनुसार हमें नवाचार पद्धति को क्रियाशील बनाने और वैज्ञानिक जिज्ञासाओं के नए परिदृश्य में प्रवेश करने के साथ-साथ इन संकल्पनाओं को उत्पादों और सेवाओं में प्रभावी और समयोजित तरीके से रूपान्तरित करने का कार्य सौंपा गया। 2016 के प्रथम सप्ताह में हमने अपनी रिसर्च काउन्सिल के साथ ''मंथन'' बैठक की और राष्ट्रीय प्राथमिकताओं के इन क्षेत्रों पर ध्यान केन्द्रित करने का निर्णय लिया।

सीएसआईआर-सीडीआरआई के इतिहास में पहली बार 21 हिट्स और लीड्स साथ-साथ विकसित करने के मिशन मोड प्रयासों पर कार्य शुरू हुआ जो एक समय में संपन्न की जाने वाली सर्वाधिक बड़ी संख्या थी। सीएसआईआर ने दो उत्पादों अर्थात् मलेरियारोधी कैन्डीडेट औषधि 97/78 और ओस्टियोपोरोसिस रोधी कैंडीडेट औषधि 99/373 के फास्ट ट्रैक विकास को अनुमोदन प्रदान किया। इसके अतिरिक्त संस्थान उच्च प्राथमिक मिशन मोड विकास के एण्टीथ्रॉम्बोटिक लीड S-007-867 और रैपिड फ्रैक्चर हीलिंग एजेण्ट S-007-1500 पर भी कार्य कर रहा है। हमने फाइटोफ़ार्मास्युटिकल ऐक्ट की अधिसूचना के पश्चात् प्रकट होने वाले अवसरों का उपयोग करने के लिये सीएसआईआर फ़ाइटोफ़ार्मास्युटिकल मिशन प्रोग्राम के निरूपण का नेतृत्व किया। फ़ाइटोफ़ार्मास्युटिकल मिशन प्रोग्राम राष्ट्र की आवश्यक चिकित्सा सुविधाओं के प्रबंधन हेतु बनाया गया है।

संस्थान ने परिभाषित किये गए लक्ष्य उत्पाद प्रोफाइल, जैव आमापन हेतु SOPS, कट ऑफ़ और डिसीज़न ट्रीज़ के साथ एक ऑनलाइन सेन्ट्रल बायोऐसे रिपोर्टिंग सिस्टम का सृजन करके एक नए इन हाउस प्रोजेक्ट एरिया के ''न्यू ड्रग डिस्कवरी ग्रुप'' के अन्तर्गत सभी प्रसांगिक औषधि खोज कार्य और क्रियाकलापों को केन्द्रित करके नए औषधि खोज कार्यक्रम को सरल एवं कारगर बना दिया। URDIP के माध्यम से विस्तृत बौद्धिक संपदा खोज का निष्पादन औषधि खोज कार्यक्रम का अभिन्न अंग बन चुका है। सीबीआरएस कार्यक्रम की हाल में की गई समीक्षा में यह प्रदर्शित हुआ कि पूरी टीम नवीन औषधि खोज की ओर एक होकर बढ़ रही है। मुझे आशा है कि पुनर्गठित परियोजना क्षेत्र सीएसआईआर-सीडीआरआई को पुनः सामने लाने के कदम को आगे बढ़ाने में हमें सहायक भूमिका का निर्वहन करेंगे। पुनर्गठित प्रोजेक्ट एरिया के समन्वयकों के पास अलग-अलग किंतु घनिष्ठ रूप से जुड़ी हुई भूमिका है। यह अपेक्षित है कि नवीन ज्ञान का सृजन, नवपरिवर्तन एवं रूपान्तरण सुसंगत तरीके से चलेंगे।

वर्ष 2016 में विभिन्न क्रियाकलापों के लिये 30 से अधिक हिट्स की खोज की जा चुकी है। 2016 में कुल 41 बाह्य परियोजनाएं प्रारंभ की गई जिनमें 6 प्रायोजित परियोजनाएं सम्मिलित है जो सीएसआईआर-सीडीआरआई के इतिहास के किसी भी वर्ष से सर्वाधिक संख्या है। इससे यह प्रदर्शित होता है कि हम प्रयोगशाला के स्ववित्तपोषित होने के प्रयासों में हम निरन्तर आगे बढ़ रहे हैं। प्रजनन मूल्यांकन हेतु प्रयोग में लाए जाने वाले जन्तुओं का स्वास्थ्य बहुत महत्त्वपूर्ण है ओर एक महत्त्वपूर्ण मुद्दा रहा है। इस वर्ष के दौरान हमने वास्तविक स्थिति की जानकारी के लिये और जन्तु स्वास्थ्य में सुधरात्मक उपाय हेतु एक अभ्यास प्रारंभ किया है। मुझे यह सूचित करते हुए हर्ष है कि हमारे उपायों से प्रयोग में लाए जाने वाले जन्तुओं की गुणवत्ता सुनिश्चित हुई है। हम अपनी मंकी फैसिलिटी का भी नवीनीकरण कर रहे हैं। पुराने परिसर में हमारी वर्तमान स्टाक सुविधा 40 वर्षों से भी अधिक पुरानी है, अतः हमने वर्तमान परिसर में नई आधुनिक LAF हेतु DPR की योजना प्रस्तुत की है।

संस्थान ने एक जीएलपी सुविधा भी स्थापित की है जो कार्य कर रही है और NGCMA से आधिकारिक मान्यता के लिये प्रतीक्षारत है। आने वाले वर्षों में संस्थान ऐक्यूट टॉक्सिसिटी स्टडीज़ और सेफ्टी फार्माकोलॉजी स्टडीज़ हेतु जीएलपी सुविधा वाली सरकारी क्षेत्र में प्रथम और एकमात्र प्रयोगशाला होने जा रही है। इसके अतिरिक्त संस्थान बायो फ़ार्मा इन्क्यूबेटर स्थापित करने के कार्य और कौशल विकास कार्यक्रमों को उच्च प्राथमिकता के साथ कर रहा है।

वर्ष के दौरान, सीएसआईआर-सीडीआरआई ने सीएसआईआर प्लैटिनम जुबली समारोहों की हेल्थ केयर थीम का भी समन्वय किया जो एक जबर्दस्त सफलता थी। हमारी टीम को सभी सीएसआईआर थीम एरिया के मध्य भारत अन्तर्राष्ट्रीय व्यापार मेले में नई दिल्ली में आयोजित टेक्नोफ़ेस्ट 2016 कार्यक्रम में स्वर्ण पदक प्राप्त हुआ। सीडीआरआई ने सीएसआईआर के हेल्थ केयर से संबंधित सभी योगदानों को संकलित करके ''हेल्थ केयर-सेफ़गार्डिंग द नेशन्स हेल्थ बाई निसकेयर'' के रूप में प्रकाशित किया। मैं समस्त टीम जेनरिक्स और हेल्थकेयर को बधाई देती हूँ।

इस वर्ष हमारे तीन वैज्ञानिकों को नैशनल एकैडमी ऑफ साइंसेज़, इलाहाबाद की प्रतिष्ठित फ़ेलोशिप प्राप्त हुई; जबकि दो वैज्ञानिकों को इनोवेटिव यंग बायोटेक्नोलॉजिस्ट अवार्ड प्राप्त हुए। मैं पुरस्कार प्राप्तकर्ताओं को पूरी तरह से बधाई देती हूँ तथा, और अधिक की कामना करती हूँ।

अन्त में मैं सभी वैज्ञानिकों, प्रभागाध्यक्षों, एरिया कोऑर्डिनेटर्स को सीएसआईआर-सीडीआरआई को राष्ट्र की अपेक्षाओं के अनुरूप परिवर्तित करके सामने लाने के लिये उनके निरन्तर सहयोग हेतु आभार प्रकट करती हूँ। आने वाले वर्षों में संस्थान और अधिक उत्साह, आशा और अभिलाषाओं के साथ अपने कार्यक्रमों का अनुसरण करेगा।

मधु दीक्षित

दिनांक : 17 फरवरी, 2017

(मधु दीक्षित)

From the Director's Desk

It's a great feeling for me to present the Annual Report of CSIR-CDRI for the year 2016-17. I am glad that, during the reporting period, the Institute has made exceptional progress in all aspects of its Charter, including new drug discovery & development, advancing the knowledge frontiers, Human Resource Development, Intellectual Property, Societal Activities, etc.

A new herbal product developed from *Dalbergia sissoo* was launched for marketing successfully on our Annual Day 2016. Initial data indicates acceptance of the product in the market. CSIR-CDRI's proud contribution - Centchroman has been again included in the National Family Planning program as preferred contraceptive. Centchroman, and Arteether (antimalarial drug), have become symbol of glorious contributions of CSIR to the Healthcare Sector. It is pride to note that both these products are now part of national programs of Government of India. Recently, we have licenced a technology of CDRI S-008-399 to M/s Ortho Regenics Pvt Ltd, Hyderabad to combat Osteoporosis and Accelerate Bone Fracture Repairing. These achievements not only give us sense of pride but also strongly motivate us to perform with more vigor in the service of Nation.

The year 2016 was one of the most challenging year. At the very beginning of the year 2016, in accordance with changing national priorities, we were given the task to energize the innovation system and enter into newer vistas of scientific enquiry as well as the effective and timely translation of these concepts into products and services. In the very first week of 2016, we had a "Manthan" meeting with our Research Council and decided to focus on the areas of National priorities.

For the first time in the history of CSIR-CDRI, Institute embarked upon mission mode efforts to develop 21 hits and leads simultaneously, highest number at any given time. CSIR approved fast track development of two products viz. Antimalarial Candidate Drug 97/78 & Anti-osteoporotic candidate drug 99/373. In addition, Institute is also pursuing high priority mission mode development of Anti-thrombotic lead S007-867 & Rapid fracture healing agent S-007-1500. We have also spear headed the formulation of CSIR Phytopharmaceutical Mission Program to exploit the opportunities emerging after the notification of Phytopharmaceutical act. Phytopharmaceutical Mission Program aims to cater the unmet medical needs of the Nation.

The Institute has streamlined the new drug discovery program by centralizing all relevant drug discovery work & activities under a new in-house project area "New Drug Discovery Group", with creation of an online Central Bioassay Reporting System (CBRS) along with defined target-product profiles, SOPs for bio-assays, cut-offs, and Decision Trees. Performing a detailed IP search through URDIP has become integral part of discovery program. Recent review of CBRS program showed that the entire team is gradually moving in tandem towards new drug discovery. I am hopeful that the re-structured project areas will play instrumental role in taking ahead the initiative of re-inventing CSIR-CDRI. The Coordinators of restructured project area have distinct but closely knitted role. It is expected that the new knowledge generation, innovation and translation will move cohesively.

In the year, 2016, more than 30 hits have been discovered for different activities. In 2016, a total of 41 external projects were initiated, including 6 sponsored projects which is a highest number for any year in the history of CSIR-CDRI. It shows, we are marching ahead steadily in efforts towards self-financing of lab.

Health of experimental animals is very important for reproducible evaluations, and has been an area of concern. During this year, we have undertaken a massive exercise to do a reality check and to take remedial

measures to improve animal health. I am happy to report that our measures have ensured the quality of experimental animals. We are also modernizing our monkey facility so as to confirm with present practices. As our existing LAD facility at old campus is more than 40 years old, we have planned and submitted DPR for a new modern LAF at the present campus.

The institute has also established a GLP facility for regulatory work which is operational and is awaiting accreditation from NGCMA which is currently in progress. In the coming year, Institute is set to become the first and the only Government Sector Lab having GLP facility for Acute Toxicity Studies & Safety Pharmacology Studies. In addition, Institute is also taking up with high priority the tasks of setting up of Bio-pharma Incubator, and Skill Development Programs.

During the year, CSIR-CDRI co-ordinated the Healthcare theme of CSIR Platinum Jubilee Celebrations which was a resounding success. Our pavilion received Gold Medal among all the CSIR Theme Areas in the Technofest 2016 event organized at New Delhi as a part of India International Trade Fair. CDRI also compiled all the health care related contributions of CSIR and published as "Healthcare: Safeguarding the Nation's Health" by CSIR. I congratulate the entire Team Generics & Healthcare.

This year, three of our Scientists received prestigious Fellowship of National Academy of Sciences, Allahabad; while two scientists received Innovative Young Scientist Awards. I heartily congratulate the awardees and wish for more.

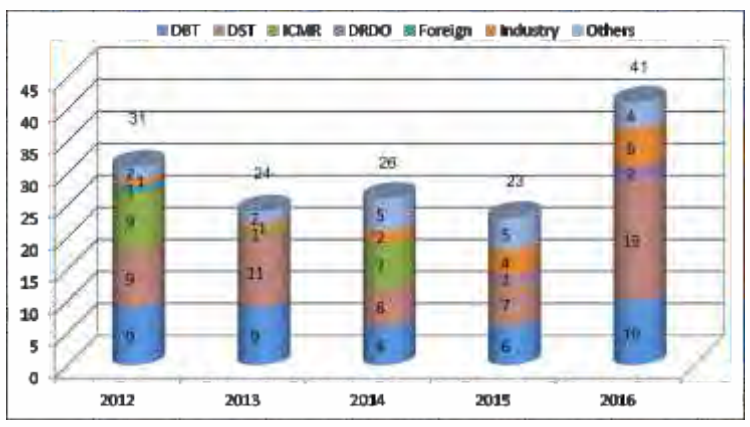
I finally take this opportunity to record my appreciation to all the Scientists, HoDs, Area Coordinators for their continued support in re-inventing the CSIR-CDRI into a path of national expectations. In the coming years, Institute will pursue its programs with greater vigor, hope and aspirations.

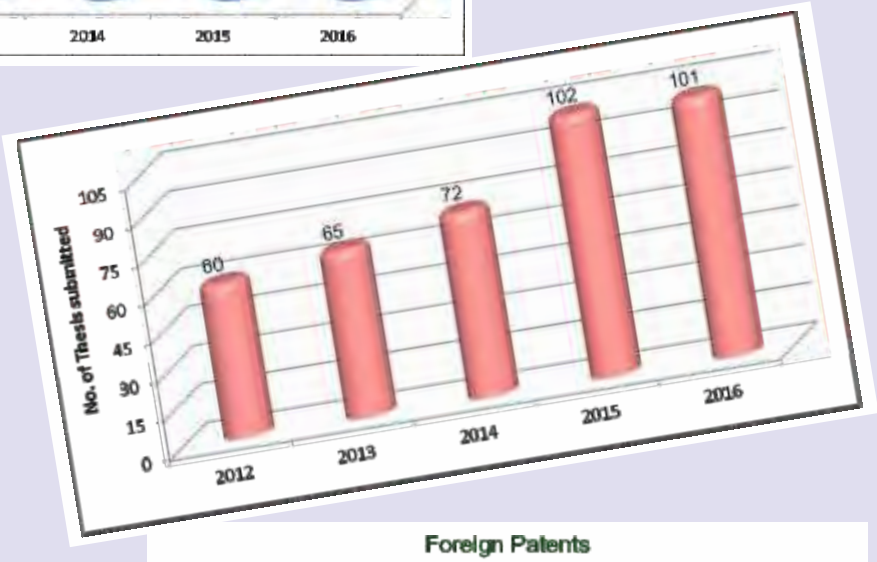
Dated: 17 February, 2017

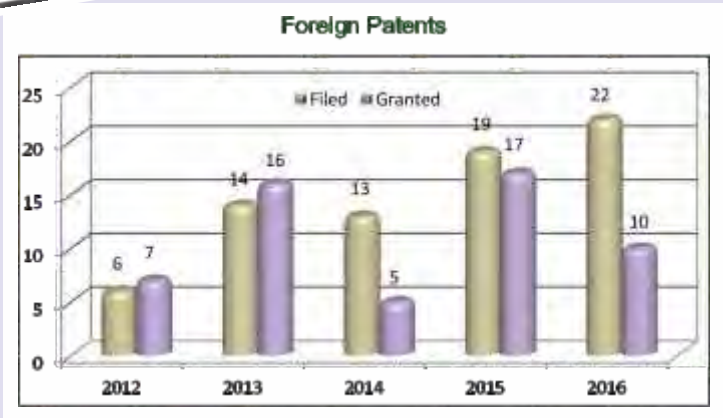
(Madhu Dikshit)

75 Years of CSIR Touching Lives

Performance Report







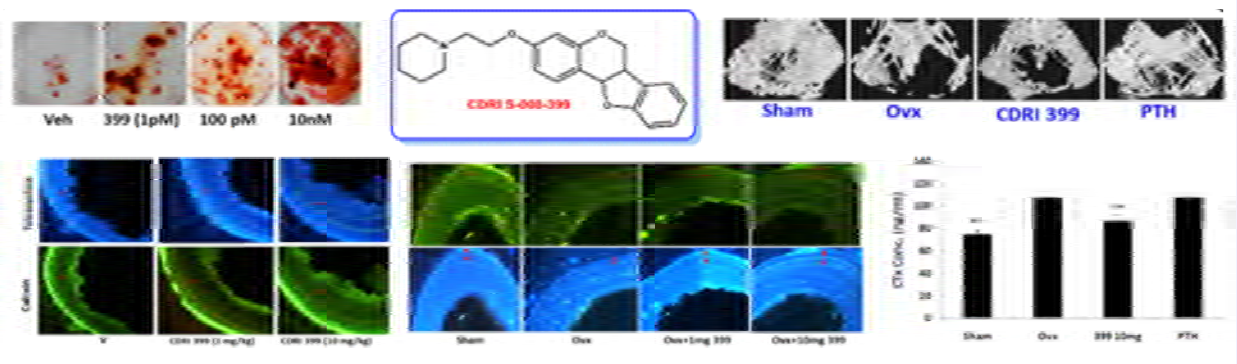
CSIR-Central Drug Research Institute, Lucknow

CSIR-Central Drug Research Institute, Lucknow

Breakthrough in 2016

Development of New Bone Anabolic Agent CDRI S-008-399 to Combat Osteoporosis and Accelerate Bone Fracture Repairing

Technology Licensed to M/s Ortho Regenics Pvt. Ltd., Hyderabad



Unique Features of the Product:

CDRI S008-399 is a potential bone anabolic agent that promoted osteoblast differentiation and mineralization at dose as low as 1 pM via activation of ER/P38MAPK/BMP-2 pathway.

Treatment of S008-399 to osteoblast cells led to increased mRNA expression of osteogenic markers like RUNX-2, BMP-2, BMP-4, Osteocalcin and Type I collagen at concentrations of 1pM.

The compound increases bone mineral density (BMD), mineral apposition rate (MAR) and bone formation rate (BFR), compared with control at 1 mg/kg/body weight and 10 mg/kg/body weight by oral administration in adult female osteopenic rat model.

Micro CT scanning of the long bones of adult osteopenic rats treated with S008-399 to determine the trabecular bone morphology revealed increased trabecular bone volume, trabecular thickness and trabecular number.

The compound improves bone quality and restores trabecular micro-architecture in ovariectomized osteopenic rats.

S008-399 treatment led to a decrease in ovariectomy induced increase in bone resorption marker like CTx, a collagen breakdown product.

The compound is devoid of any uterine estrogenicity thus eliminating the risk of endometrial carcinoma and safe for consumption.

Further developmental studies on CDRI S-008-399 for the treatment of osteoporosis and bone fracture repairing will be conducted jointly by the CSIR-CDRI and M/s Ortho Regenics Pvt. Ltd., Hyderabad

Breakthrough in 2016

Standardized Extract of *Dalbergia sissoo* for accelerated fracture healing & management of post-menopausal osteoporosis

Launched for marketing on 17 February 2016

Picture: Reunion launched by Dr Soumya Swaminathan, Secretary Department of Health Research & Director General, Indian Council of Medical Research during Annual Day event on 17 Feb 2016. Dignitaries on (L-R): Dr Madhu Dikshit, Director, CSIR-CDRI; Dr Rakesh Kapoor, Director, SGPGI, Lucknow; Dr Rakesh Shukla, Chief Scientist & Head, Pharmacology, Dr. Sanjeev Agrawal, Chairman & Managing Director, Aeran Lab India Pvt. Ltd. Thane, Mr. Anand Dubey, Executive Vice President, Marketing, Aeran Labs, India Pvt. Ltd. Thane

Unique Features of the product:

- Novel and abundantly present marker Compound - CAFG increases chondrogenic differentiation of cells
- Studies on adult female osteopenic rat model showed increased mineral apposition and bone formation rate thus increased bone mineral density.
- DS ethanolic extract, evaluated in rat rapid fracture healing model, stimulated callus and fracture healing at dose as low as 250.0 mg/kg body weight.
- CAFG was evaluated in mice in post-menopausal model for osteoporosis & rapid fracture healing model (1 & 5 mg/kg body weight). It stimulated fracture healing by activating Wnt/â catenin signalling pathway.
- CAFG is devoid of uterine estrogenicity, thus is safe for consumption

Technology licensed to Pharmanza Herbal Pvt. Ltd. Gujarat

Clinical trial on accelerated fracture healing at Karandikar Hospital and Research Centre, Nasik, Maharashtra

Breakthrough in 2016

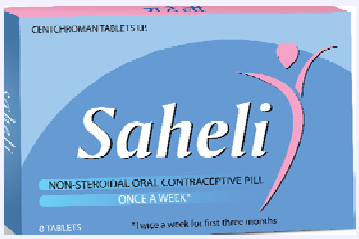
Centchroman (*Ormeloxifene*)
Included in the National Family Planning Program

Ministry of Health & Family Welfare, Government of India introduced Centchroman as a recommended Contraceptive agent on 5 April 2016 during National Summit on Family Planning Programme. Government will be providing it free of cost to the women all over India under the rechristened brand name Chhaya.

Marketed by HLL Lifecare Ltd., Thiruvananthapuram

Centchroman - Unique features :

- The first non-steroidal oral contraceptive developed anywhere in the world.
- It is a weak estrogen and a potent antiestrogen with a high therapeutic index.
- A weekly tablet- more convenient to use – chances of non-compliance negligible.
- Also effective in Dysfunctional Uterine Bleeding being sold under the brand name, Novex-DS by HLL Lifecare Ltd.
- Can also be taken as an Emergency or Post-Coital Pill - Sold as TATKAL-72.
- Govt of India has now decided to distribute the tablet free through Aasha volunteers and in healthcare Centres - to be distributed under the brand name Chhaya.
- Centchroman also found effective for osteoporosis and many types of cancer including breast cancer. Further work is being carried out.



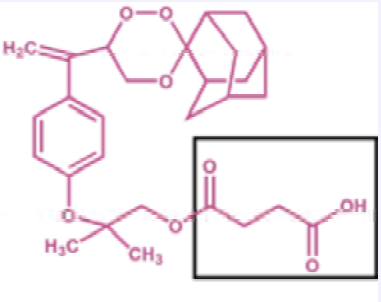
Translational Research Activities

Ongoing Fast Track Translational Research Projects

FTT Project 1 - Antimalarial Candidate Drug 97/78 (multi-drug resistant)

According to the *World Malaria* report 2015 of the World Health Organization (WHO), there were 214 million cases of malaria all over world in 2014

Malaria remains the major public health problem in India. Northeastern region of India is one of the hot spots for malaria transmission. Focal outbreaks of malaria are of common occurrence especially in forest-fringed villages of Assam, bordering Arunachal Pradesh. Orissa alone contributes to more than 40% of *P. falciparum* deaths in India.



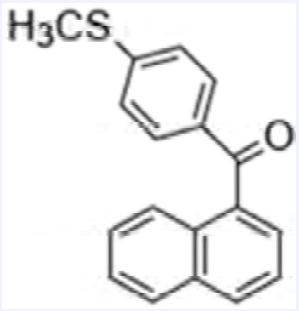
Candidate Drug 97/78 - Unique features :

- Synthetic 1,2,4-trioxane
- Schizonticidal activity
- Active against multidrug resistant *Plasmodium.*
- Anti-malarial activity against
  - Chloroquine resistant *P. falciparum in vitro*
  - Multidrug resistant *P. yoelii* in mice
  - *P. cynomolgi* in Rhesus monkeys.
- Active by oral, *i.m.* & *i.v.* routes both in rodent and monkey malaria models

Multiple dose Phase I Clinical Trial at PGIMER, Chandigarh to be initiated shortly after DCGI approval

FTT Project 2 - Anti-resorptive Candidate Drug 99/373 for post-menopausal osteoporosis

Osteoporosis is a silent disease until it is complicated by fractures that occur following minimal trauma or, in some cases, with no trauma. Globally Osteoporosis is expected to be more than US$ 40 Billion market by 2019. China and India together have close to 80% of elderly osteoporosis patients worldwide. The market potential of an affordable bone Healing therapy in India is enormous. Globally it has enormous market potential.



Candidate Drug 97/78 - Unique features :

- A promising alternative for the prevention and treatment of osteoporosis.
- Found safe in preclinical regulatory pharmacology and toxicity studies.
- DCGI permission to carry out Phase-I clinical trial. Re-endorsement awaited
- Product has distinct advantage over existing clinically used drugs like Raloxifene and Bis-phoaphonates in efficacy as well as toxicity.

Single dose Phase I Clinical Trial at KEM hospital Mumbai to be initiated shortly after DCGI approval

Translational Research Activities

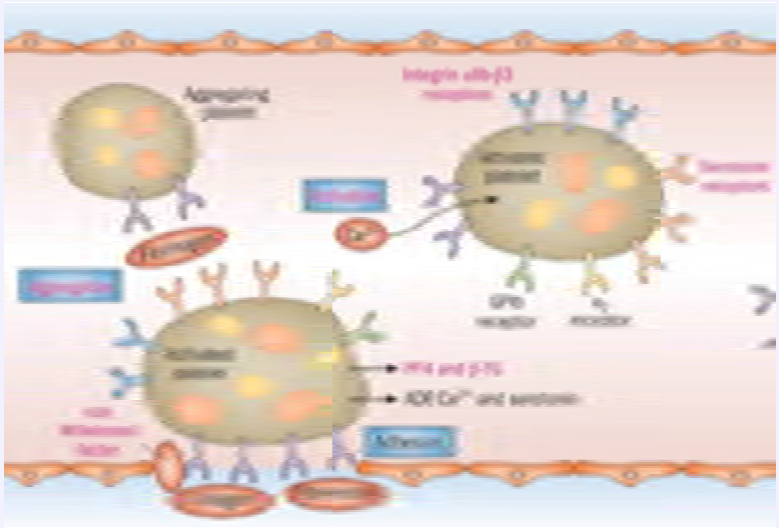
Ongoing High Priority Mission Mode Translational Research Projects

A Novel, Efficacious, Target Selective and Safe Anti-thrombotic lead S-007-867

Currently available antithrombotic drugs are associated with significant drawbacks that limit their use. Hence there is a real unmet clinical need for developing novel and safer antithrombotic agents. An increasing number of people are presenting with risk factors for thromboembolic events due to the rapidly aging population

Technological Readiness of S-007-867

- Orally active, reversible inhibitor of collagen induced platelet adhesion and aggregation
- No effect on coagulation cascade proteins and no adverse effect on vasoreactivity.
- Significantly prevent thrombosis in various experimental models (efficacy dose 12mg/kg)
- More potent than the "gold standard" anti-thrombotic drug Aspirin, clopidogrel, losartan & EXP3179
- Safety pharmacology, mutagenic and toxicity studies in rodents demonstrate no adverse effect.



- Tested *in vitro* for binding to 451 kinases and important GPCRs.
- Good pharmacokinetic profile.

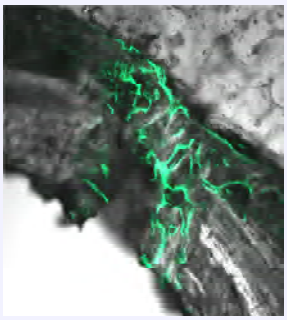
Toxicity study to be initiated in Monkeys

Rapid Fracture Healing Lead Compound S-007-1500

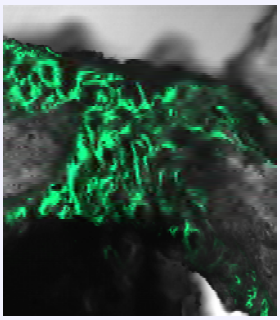
Currently, no orally active rapid fracture repairing agent is available nationally and internationally. Our Studies have led to identification of osteogenic activity in molecules like medicarpin (Mol Cell Endocrinol 2010, 325(1-2), 101-9). Subsequently, several synthetic analogues of Medicarpin have been designed. Of these, CDRI-S-007-1500 has been found to have bone regeneration potential as assessed by its effect on chondrogenesis and fracture callus formation.

Technological Readiness of S-007-1500

- New bone formation at the fracture site increase by ~40% in rats.
- Increases callus formation at 1 mg/kg dose and restores trabecular microarchitecture in rats.
- Accelerated fracture repair by BMP-2/Smad signalling pathway.
- Compound found safe in single dose toxicity studies in rodents and in 10 days DRF studies.
- Essential Safety Pharmacology study as per schedule Y is completed and no mortality / adverse effect was observed.



Vehicle



S-007-1500 (1 mg / kg)

Toxicity studies in rodents…..ongoing

Translational Research Activities

Mission mode Lead Optimization Program

Therapeutic Areas	Disease area	Leads	Hits / Pipeline	New Initiatives & Drug targets
Parasitic Diseases	Malaria	S-011-1793 chloroquine resistance	SMEDDS formulation	Liver stage malaria, Vaccine New Targets: SufS, SufC-D, Serine threonine Protein Kinase
	Leishmania		98/288	Dipeptidylcarboxypeptidase Trypanothione reductase, Vaccine
Microbial Infections	Tuberculosis	Microparticle formulation of drugs	FAS II inhibitor S012-0241	DNA Ligase, ATP synthase, etc.
	Gram Positive & Negative Bacteria		S-015-728, S-015-816 & S-016-1271	Anti-infective Peptides
Osteoporosis Fracture healing	Bone Health		Drugs identified for re-positioning	Re-positioning of FDA drugs
CVS, CNS & other disorders	Anti-thrombotic	S-007-867	S-002-333	
	Diabetes & Dyslipidemia	CDR 267-F018	Hits under *in vivo* evaluation	PCSK9, GPR109a, GLP-1R & Pancreastatin
	Major depression		S-013-1304, S-015-2448	Kappa opioid receptor and TrkB,
	Obesity		S-013-1593	HRH3 & 5-HT2C receptors
Cancer	Breast cancer, colon cancer	S-007-1235	FDA approved drug identified for CML	*Triple negative Breast Cancer* Re-positioning of FDA drugs

Ongoing Programs with Industry Partnership

Important Awards

Fellows of the National Academy of Sciences, India, 2016

Dr Renu Tripathi

Dr Tripathi has shown exceptional leadership in systematic development of new antimalarials based on Artemisinin. Her original experimental studies lead to the discovery of α/β Arteether, α and β Arteether, α Artelinate, 1,2,4-Trioxanes as antimalarial drugs in experimental malaria models. These studies led to the marketing of α/β Arteether (EMAL) which is internationally recognized and patented. The drug can protect patients against MDR Malaria and also has unique malaria transmission blocking potential reported for first time. Candidate received 2 times CSIR Technology Award for Innovation (1998, 2009).

Dr Sanjay Batra

Dr Batra has significantly contributed towards design and synthesis of compounds of pharmacological significance. His group has been instrumental for developing general approaches to an array of N-, O- and S-heterocycles employing Morita-Baylis-Hillman adducts or their derivatives as the key intermediates. The utility of chemistry is extended for preparing fused-systems, natural product mimics and drugs including Tamiflu. His contribution in the area is noteworthy as it has not only unfolded several novel chemical transformations generating new basic knowledge but has found end use in the form of identification of novel scaffolds as antiparasitic and anticancer agents. His contemporary approach with transition-metal and iodine-mediated cascade reactions involving hetero- and decarboxylative couplings, C-H functionalization, isonitrile insertion, oxidative reactions, electro-cyclization etc. has allowed him to develop complementary routes to various heterocyclic and alicyclic scaffolds of biological significance.

Dr Sabyasachi Sanyal

Dr Sanyal is an outstanding molecular biologist with commending expertise in cellular signaling. He has contributed immensely to the CDRI drug development by identifying mechanism of action of candidate drug molecules. He has been instrumental in discovering world's first small molecule orally active adiponectin receptor 1 (AdipoR1) agonist (PCT/IN2014/000464 and Singh et al, Diabetes, 63: 3530) and this discovery not only paves way for new generation disease-modifying therapeutics in diabetes, but also helped CDRI to license the CDRI AdipoR1 agonist GTDF to Kemxtree LLC. Depletion of adiponectin in plasma is associated with a plethora of diseases including insulin resistance, type 2 diabetes (T2D), cardiovascular diseases and cancer. Despite its key role in various physiological processes, adiponectin replenishment therapy has not been possible owing to logistical issues associated with adiponectin production and lack of a small molecule AdipoR agonist. Dr. Sanyal identified CDRI osteoanabolic compound GTDF as an AdipoR1 agonist through an elegant and objective mechanistic exploration. He showed that GTDF not only drastically improved T2D in different animal models, it also enhanced pancreatic cell survival and remarkably reduced cardiovascular risk factors (Singh et al, Diabetes, 63: 3530). He later discovered that GTDF reverses T2D-induced osteopenia (Khan et al, Diabetes 64: 2609), via direct AdipoR1-mediated action on bone. His discovery of GTDF as an AdipoR1 agonist and its impact on various hitherto undiscovered pathways has advanced the field of T2D and osteoporosis.

The Generics & Healthcare theme area, co-ordinated by CSIR-CDRI and CSIR-IICT received Gold Award by CSIR in the Platinum Jubilee Technofest - 2016

Some Important Publications 2016

Chemical Sciences

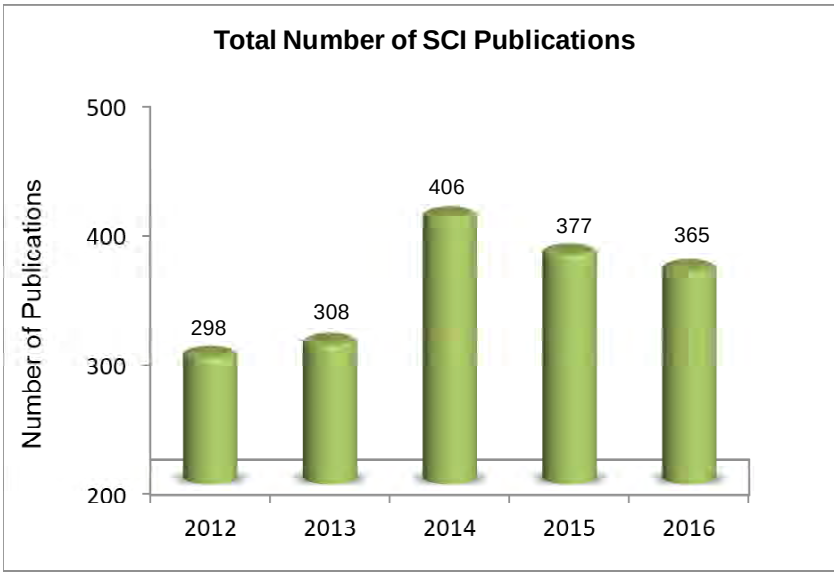
Title	Authors	Journal Year, Vol(Iss), PP	Impact Factor
Vitamin B6 Tethered Endosomal pH Responsive Lipid Nanoparticles for Triggered Intracellular Release of Doxorubicin	Sharma S, Verma A, Singh J, Teja BV, Mittapelly N, Pandey G, Urandur S, Shukla RP, Konwar R and Mishra PR.	**ACS Applied Materials & Interfaces** 2016, 8(44), 30407-30421	7.145
Intramolecular Csp2–Csp2 Friedel–Crafts Arylation: Substrate- and Condition-Controlled Divergent Synthesis of Fused-β-carbolines	Dighe SU, Yadav VD, Mahar R, Shukla SK and Batra S	**Organic Letters** 2016, 18 (23), 6010-6013	6.732
Metal-Free Three-Component Domino Approach to Phosphonylated Triazolines and Triazoles	Ahamad S, Kant R and Mohanan K.	**Organic Letters** 2016, 18(2), 280-283	6.732
Diastereoselective Synthesis of 5-Heteroaryl-Substituted Prolines Useful for Controlling Peptide-Bond Geometry	Ali R, Singh G, Singh S, Ampapathi RS and Haq W.	**Organic Letters** 2016, 18(12), 2848-2851	6.732
Synthesis of Substituted Furan/Pyrrole-3-carboxamides through a Tandem Nucleopalladation and Isocyanate Insertion	Rajesh M, Puri S, Kant R and Reddy MS.	**Organic Letters** 2016, 18(17), 4332-4335	6.732
Metal-Free Oxidative Nitration of α-Carbon of Carbonyls Leads to One-Pot Synthesis of Thiohydroximic Acids from Acetophenones	Dighe SU, Mukhopadhyay S, Priyanka K and Batra S.	**Organic Letters** 2016, 18(17), 4190-4193	6.732
Betaine Mediated Synthesis Of Annulated Dihydrofurans from Oxobis(methylthio)ketene Acetals and N-butyl-N '-methyl ethane-1,2-Diamine as Precursors via NHC Elimination	Kumar A, Maurya S, Pratap K and Srivastava S.	**Chemical Communications** 2016, 52(13), 2795-2798	6.567
A direct access to isoxazoles from ynones using trimethylsilyl azide as amino surrogate under metal/catalyst free conditions	Kumar GR, Kumar YK and Reddy MS.	**Chemical Communications** 2016, 52(39), 6589-6592	6.567
Visible Light Catalyzed Methylsulfoxidation of (het)aryl Diazonium Salts using DMSO	Pramanik MMD and Rastogi N	**Chemical Communications** 2016, 52(55), 8557-8560	6.567
Cu-Catalyzed Iminative Hydroolefination Of Unactivated Alkynes en route to 4-Imino-tetrahydropyridines and 4-Aminopyridines	Kumar R, Thorat SH and Reddy MS.	**Chemical Communications** 2016, 52(92), 13475-13478	6.567
Palladium(II)-Catalyzed Sequential Aminopalladation and Oxidative Coupling with Acetylenes/Enones: Synthesis of Newly Substituted Quinolines from 2-Aminophenyl Propargyl Alcohols	Thirupathi N, Puri S, Reddy TJ, Sridhar B and Reddy MS.	**Advanced Synthesis & Catalysis** 2016, 358(2), 303-313	6.453
Visible Light-Induced Iodine-Catalyzed Transformation of Terminal Alkynes to Primary Amides via C C Bond Cleavage under Aqueous Conditions	Dighe SU and Batra S.	**Advanced Synthesis & Catalysis** 2016, 358(3), 500-505	6.453
Synthesis of Highly Substituted Imidazo[1,5-a]quinoxalines Through a Multicomponent Reaction Followed by Deprotection-Cyclization	Sashidhara KV, Dodda RP, Upadhyay A, Palnati GR, Modukuri RK and Kant R.	**Advanced Synthesis & Catalysis** 2016, 358(16), 2612-2618	6.453
Nickel(II)-Mediated Regioselective C H Monoiodination of Arenes and Heteroarenes by using Molecular Iodine	Khan, B, Kant R and Koley D.	**Advanced Synthesis & Catalysis** 2016, 358(14), 2352-2358	6.453
Directing Group Assisted Cu(II)-Catalyzed Ortho Carbonylation to Benzamide using AIBN	Khan B, Khan AA, Kant R and Koley D.	**Advanced Synthesis & Catalysis** 2016, 358(23), 3753-3758	6.453

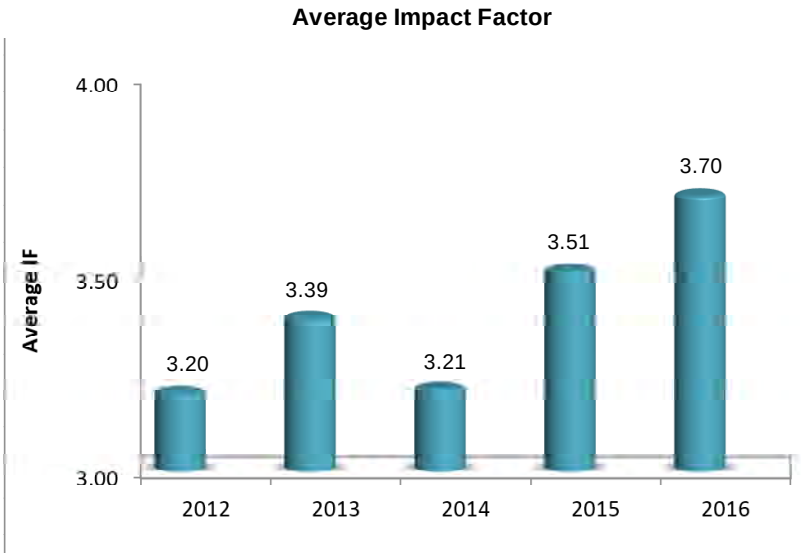
Some Important Publications 2016

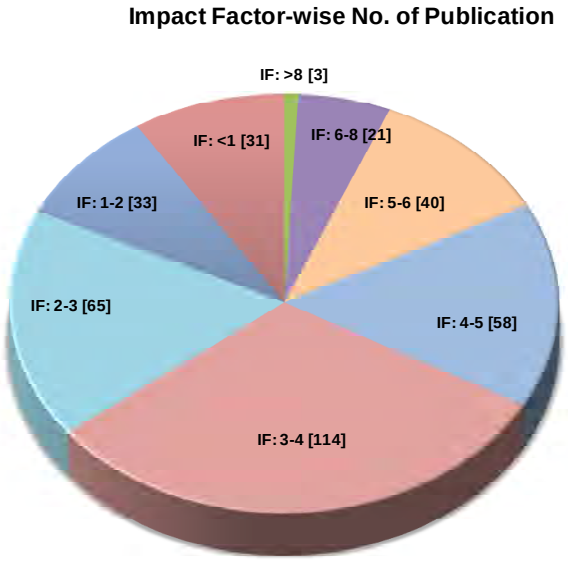
Biological Sciences

Title	Authors	Journal Year, Vol(Iss), PP	Impact Factor
Expression of an Insecticidal Fern Protein in Cotton Protects Against Whitefly	Shukla AK, Upadhyay SK, Mishra M, Saurabh S, …. …. … … … .. Nair KN, Bhadauria S, Wahajuddin M, Singh S, Sharma S, Omkar, Upadhyay RS, Ranade SA, Tuli R and Singh PK.	**Nature Biotechnology** 2016, 34, 1046-1051	43.113
Targeted Pulmonary Delivery Of Inducers of Host Macrophage Autophagy as a Potential Host-Directed Chemotherapy of Tuberculosis	Gupta A, Misra A and Deretic V.	**Advanced Drug Delivery Reviews** 2016, 102, 10-20	15.606
Matrix Reloaded: CCN, tenascin and SIBLING group of Matricellular Proteins in Orchestrating Cancer Hallmark Capabilities	Thakur R and Mishra DP.	**Pharmacology & Therapeutics** 2016, 168, 61-74	11
Macrophages Promote Matrix Protrusive and Invasive Function of Breast Cancer Cells via MIP-1β Dependent Upregulation of MYO3A Gene in Breast Cancer Cells	Baghel KS, Tewari BN, Shrivastava R, Malik SA, Lone MU, Jain NK, Tripathi C, Kanchan RK, Dixit S, Singh K, Mitra K, Negi MP, Srivastava M, Misra S, Bhatt ML and Bhadauria S.	**Oncoimmunology** 2016, 5 (7) e1196299	7.644
Layered Double Hydroxides as Effective Carrier for Anticancer Drugs and Tailoring of Release Rate Through Interlayer Anions	Senapati S, Thakur R, Verma SP, Duggal S, Mishra DP, Das P, Shripathi T, Kumar M, Rana D and Maiti P.	**Journal of Controlled Release** 2016, 224, 186-198	7.441
Translation in Organelles of Apicomplexan Parasites	Habib S, Vaishya S and Gupta K.	Trends in Parasitology 2016, 32(12), 939-952	7.295
UIS2: A Unique Phosphatase Required for the Development of Plasmodium Liver Stages	Zhang M, Mishra S, Sakthivel R, Fontoura BMA and Nussenzweig V.	**Plos Pathogens** 2016, 12(1), e1005370	7.003
Overexpression of *Plasmodium berghei* ATG8 by Liver Forms Leads to Cumulative Defects in Organelle Dynamics and to Generation of Noninfectious Merozoites	Voss C, Ehrenman K, Mlambo G, Mishra S, Kumar KA, Sacci JB Jr, Sinnis P and Coppens I.	**Mbio** 2016, 7(3), e00682-16	6.975
Vitamin B12 Functionalized Layer By Layer Calcium Phosphate Nanoparticles: A Mucoadhesive and pH Responsive Carrier for Improved Oral Delivery of Insulin	Verma A, Sharma S, Gupta PK, Singh A, Teja BV, Dwivedi P, Gupta GK, Trivedi R and Mishra PR.	**Acta Biomaterialia** 2016, 31, 288-300	6.008
Platelet CD40L Induces Activation of Astrocytes and Microglia in Hypertension	Bhat SA, Goel R, Shukla R and Hanif K.	**Brain, Behavior & Immunity** 2016, 59, 173-189	5.874
Oxidized LDL Induced Extracellular Trap Formation in Human Neutrophils via TLR-PKC-IRAK-MAPK and NADPH-oxidase Activation	Awasthi D, Nagarkoti S, Kumar A, Dubey M, Singh AK, Pathak P, Chandra T, Barthwal MK and Dikshit M.	**Free Radical Biology and Medicine** 2016, 93, 190-203	5.784
The *M. tuberculosis* HAD Phosphatase (Rv3042c) Interacts with Host Proteins and is Inhibited by Clofazimine	Shree S, Singh AK, Saxena R, Kumar H, Agarwal A, Sharma VK, Srivastava K, Srivastava KK, Sanyal S and Ramachandran R.	**Cellular & Molecular Life Sciences** 2016, 73(17), 3401-3417	5.694
Odanacatib Restores Trabecular Bone of Skeletally Mature Female Rabbits With Osteopenia but Induces Brittleness of Cortical Bone: A Comparative Study of the Investigational Drug With PTH, Estrogen, and Alendronate	Khan MP, Singh AK, Singh AK, Shrivastava P, Tiwari MC, Nagar GK, Bora HK, Parameswaran V, Sanyal S, Bellare JR and Chattopadhyay N.	**Journal of Bone and Mineral Research** 2016, 31(3), 615-629	5.622

Publications



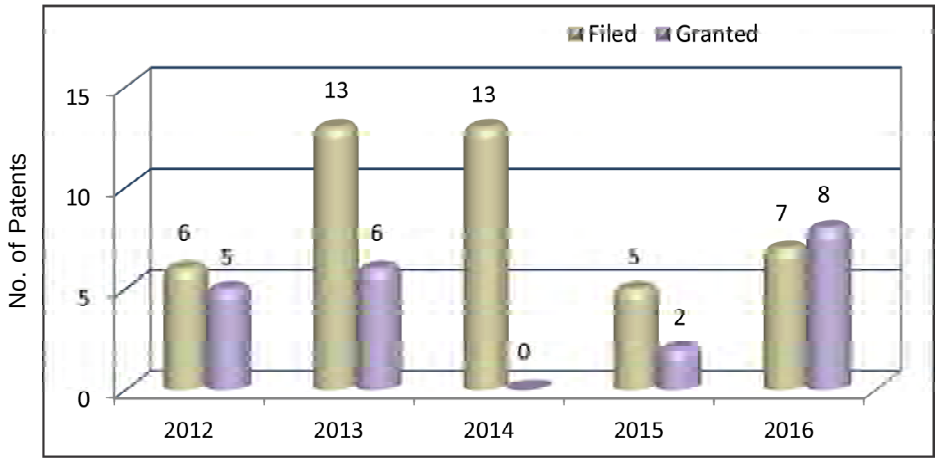




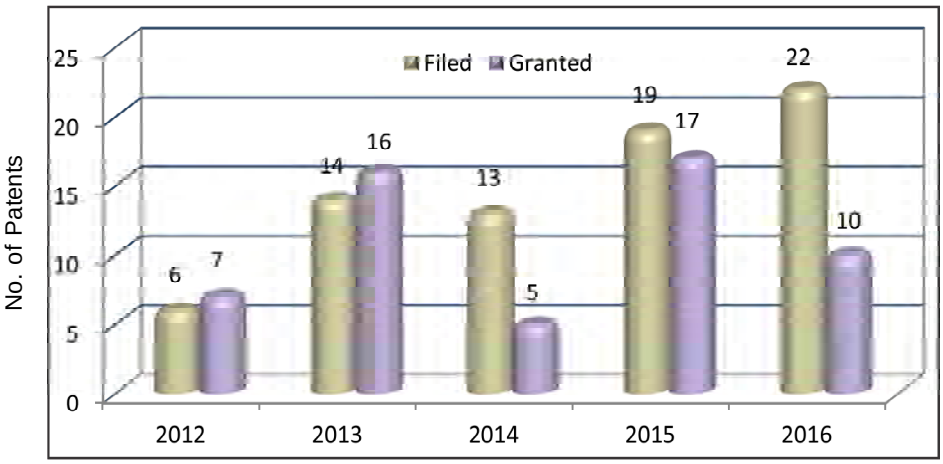
Provisional data as on 31/01/2017

Intellectual Property

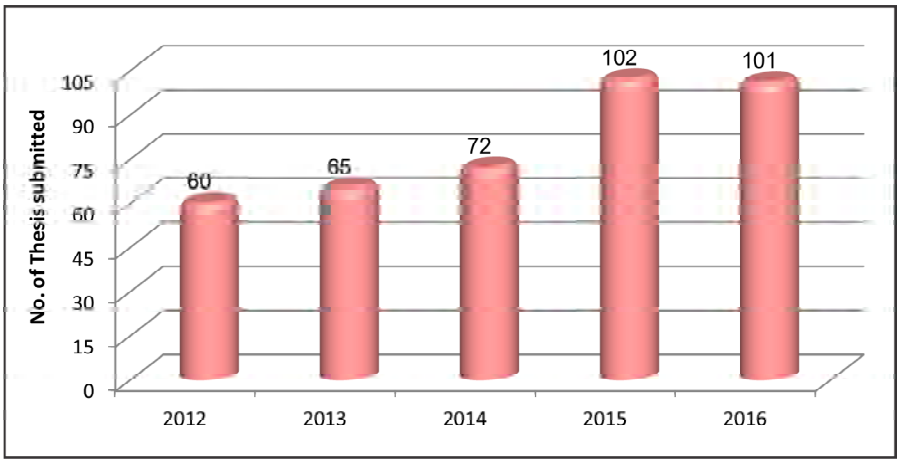
Indian Patents



Foreign Patents



Ph.D. Thesis Submitted



Provisional data as on 31/01/2017

New Facilities Created

GLP Infrastructure for Acute Toxicity Studies & Safety Pharmacology Studies

CSIR–CDRI has submitted application for Certification of facilities for following IND enabling studies. Inspection of facility scheduled for third week of February 2017

CSIR-CDRI is set to become the first and the only Government Sector Lab having GLP facility for Acute Toxicity Studies & Safety Pharmacology Studies

New Facilities Created

CDRI Online Compound submission & Bioassay Reporting System (CBRS)

Compounds

- 35,000 In-house compounds
- 52,000 small molecules library purchased
- 210 Natural Products

Bioassays

- 29 Phenotypic screens
- 13 Target-based screens

Features

- Accessible Structure database for Bioinformatics
- Real time reporting (data submission)
- Feedstock for repositioning & future bioassays

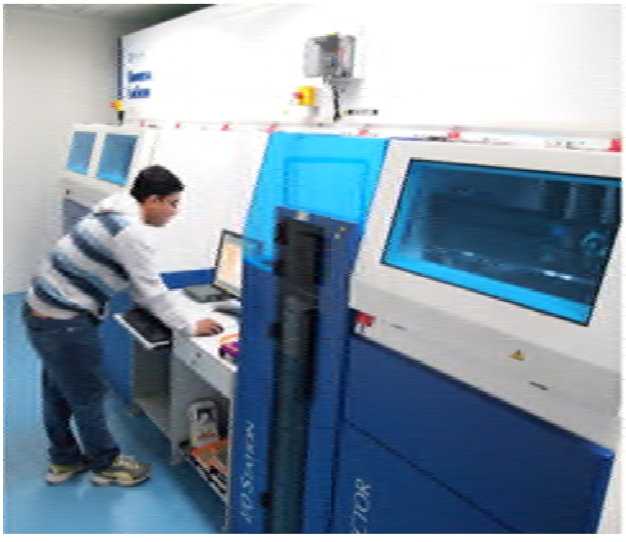
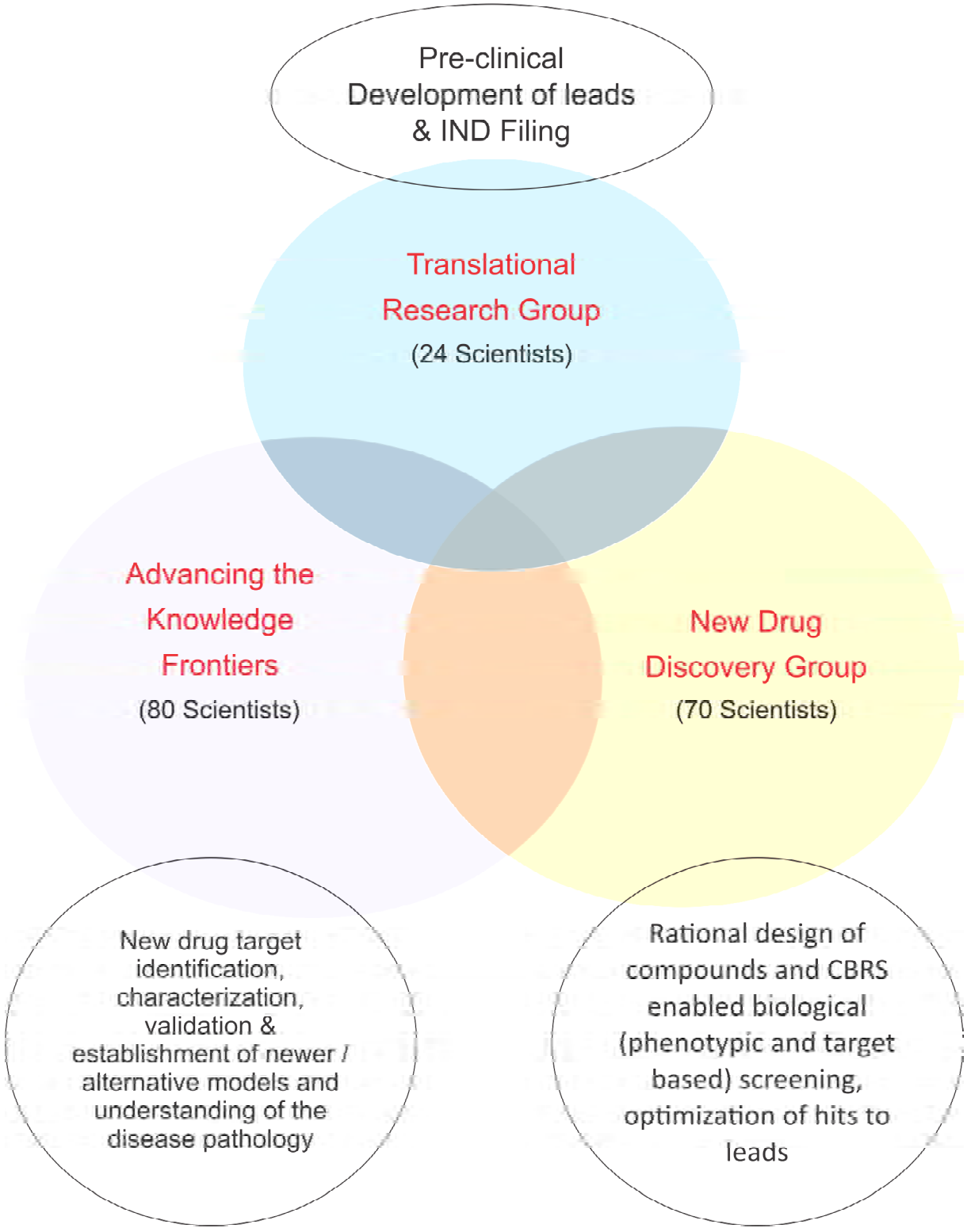


Photo: Universal Store - Automated Storage & Retrieval System for Organic Compounds

Photo: Liquid Handling System for sample preparation for Bio-assays

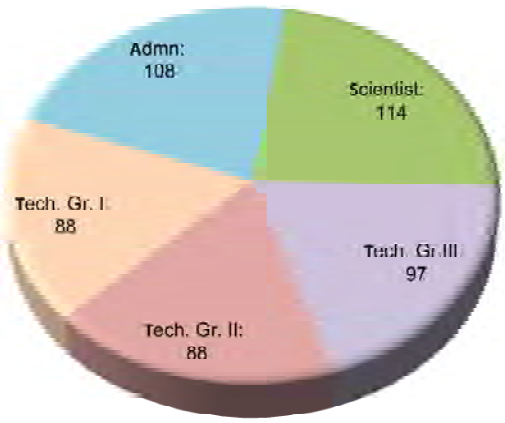
Re-structuring of Research Areas

To meet the renewed expectations and challenges, for focussed efforts in mission mode along with commitment for new knowledge generation for advancing the knowledge frontier, research areas have been re-structured.

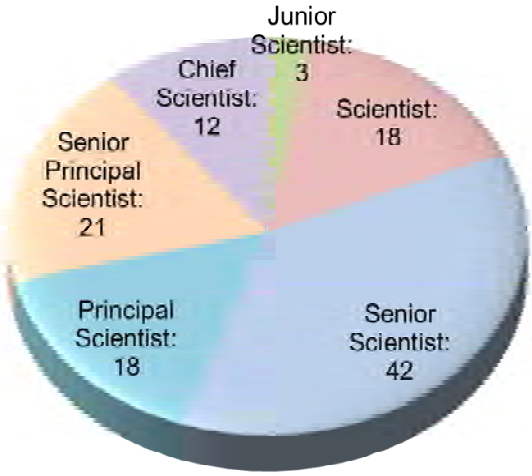


Manpower

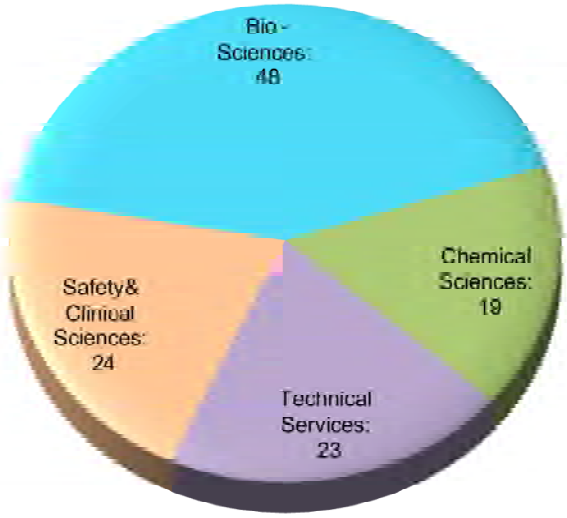
Total Staff (495)



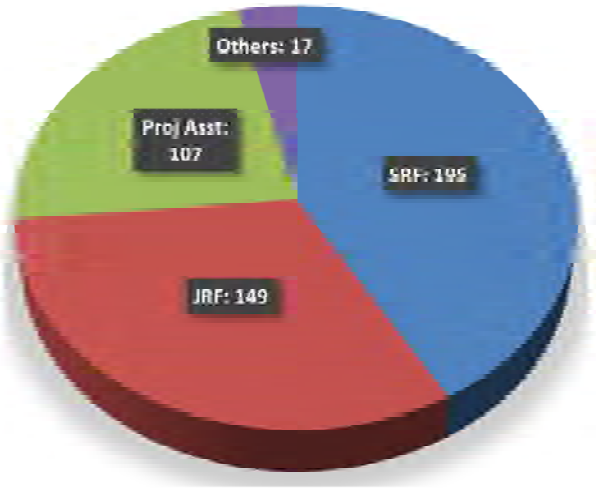
Designation-wise Strength of Scientists



Ares-wise Strength of Scientist



Research Fellow and Project Assistant



Announcement

CDRI Awards 2017

The prestigious CDRI Awards 2017 for Excellence in Drug Research in **Life Sciences** category has been awarded jointly to **Dr Suvendra Nath Bhattacharyya,** Principal Scientist, CSIR-IICB, Kolkata and **Dr Jayandharan Giridhara Rao,** Associate Professor, IIT, Kanpur.

In the **Chemical Sciences** category, the award has gone jointly to **Dr Chada Raji Reddy,** Principal Scientist, CSIR-IICT, Hyderabad and **Dr Jayanta Haldar,** Associate Professor, JNCASR, Bengaluru.

Our heartiest congratulations to all the awardees!
The felicitation ceremony will be held on 26 September 2017

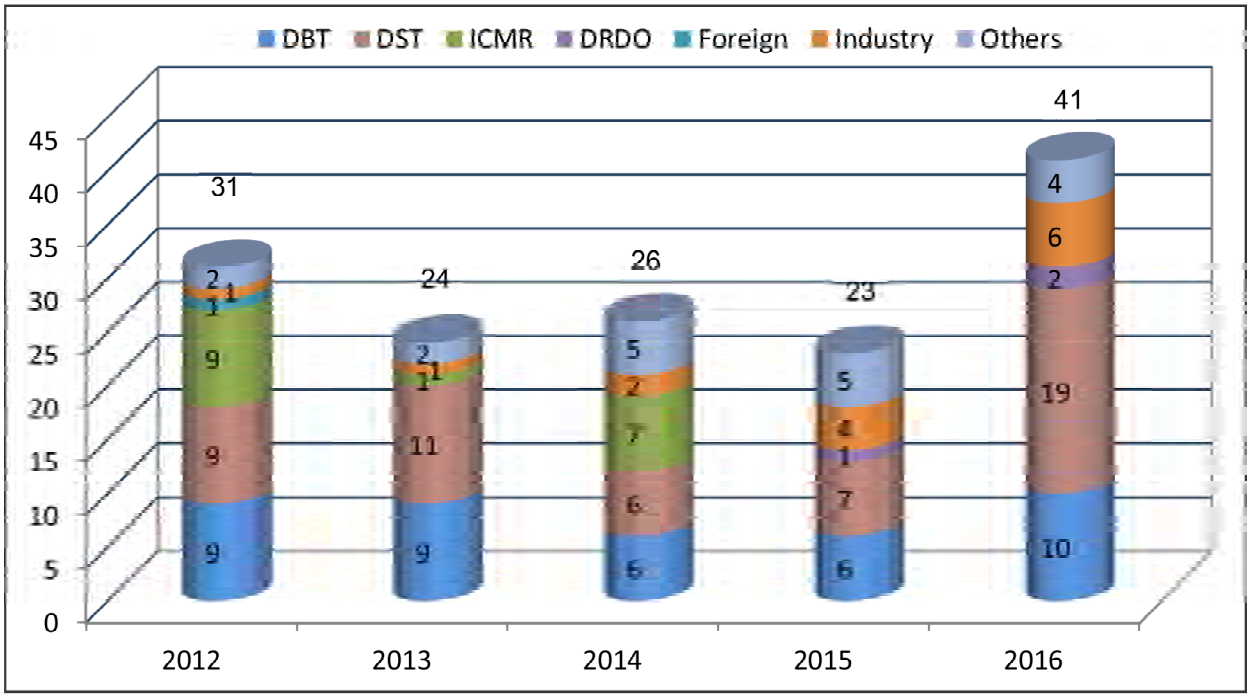
Budget

Rs. In Lakh

	Heads	2012-13	2013-14	2014-15	2015-16	2016-17* (Allocated)
(A)	**Recurring**					
	Pay and Allowances	4340.300	4631.798	4834.234	4916.152	4920.500
	Contingencies	797.111	910.384	1011.075	1386.000	1018.000
	HRD	4.000	-	-	-	0.800
	Maintenance	475.374	416.574	560.000	732.000	718.000
	Chemical and Consumables	1092.250	260.000	860.000	1189.152	1323.000
	Sub-Total	**6709.035**	**6218.756**	**7265.309**	**8223.304**	**7980.300**
(B)	**Capital**					
	Works and Services/ Electrical Installation	98.522	96.326	7.189	56.547	200.000
	Apparatus and Equipments/ Computer Equipments	820.000	286.834	650.000	1183.946	1203.000
	Office Equipments, Furniture and Fittings	7.000	4.019	-	3.825	-
	Library Books and Journals	175.000	75.469	250.000	250.488	75.000
	Sub-Total	**1100.522**	**462.648**	**907.189**	**1494.806**	**1478.000**
	Total (A+B)	**7809.557**	**6681.404**	**8172.498**	**9718.11**	**9458.300**
(C)	**Special Projects SIP / NWP / IAP / HCP / BSC / CSC**	**1901.464**	**3543.532**	**2199.945**	**3662.966**	**2060.318**
(D)	**CMM0015 (New CDRI)**	**-**	**-**	**4000.000**	**1097.000**	**-**
(E)	**CSIR-800 (Societal Activities) P-14**	**-**	**-**	**-**	**-**	**100.00**
	Grand Total (A+B+C+D)	**9711.021**	**10224.936**	**14372.443**	**14478.076**	**11618.618**

**Provisional data as on 31-01-2017, included expenditure against LRF*

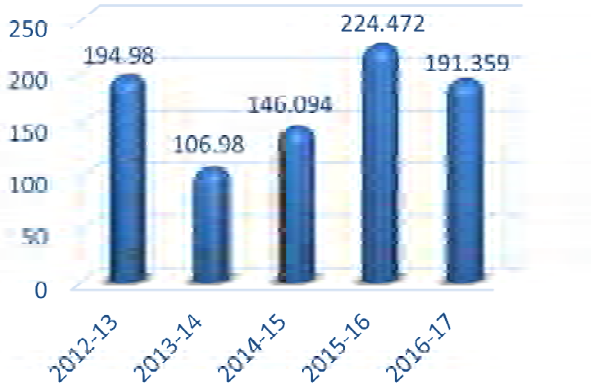
New Inter-Agency Projects Initiated



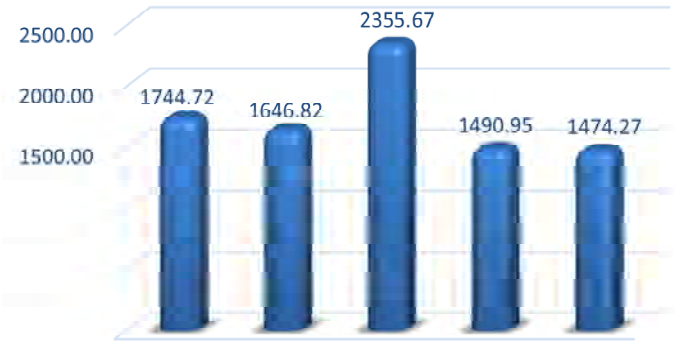
External Budgetary Resources

External Cash Flow
(Including Govt Agencies, Foreign Agencies and Industries

Lab Reserve Fund Generated



Total External Budgetary Resources



Research Council

Chairman

Prof. N K Ganguly
Distinguished Biotechnology Professor,
C/o National Institute of Immunology,
Aruna Asaf Ali Marg,
New Delhi – 110 067

Members

Dr Shahid Jameel
CEO, The Welcome Trust /
DBT India Alliance,
H.No. 8-2-684/3/K/19,
Ist Floor, Road No. 12, Banjara Hills,
Hyderabad - 500 034

Dr Subrata Sinha
Director
National Brain Research Centre
Manesar, Gurgaon,
Haryana-122 051, India

Dr Chandrima Shaha
Director
National Institute of Immunology,
Aruna Asaf Ali Marg,
New Delhi 110 067

Cluster Director
Dr Ram A Vishwakarma
Director
CSIR-Indian Institute of
Integrative Medicine
Canal Road, Jammu-180001

Dr T S Balganesh
Distinguished Scientist
CSIR-Centre for Mathematical
Modelling and Computer
Simulation (C-MMACS),
NAL Belur Campus, Bangalore–560037

Sister Laboratory
Prof. A K Tripathi
Director
CSIR-Central Institute of Medicinal &
Aromatic Plants,
Lucknow–226015

Prof. A Surolia
Molecular Biophysics Unit,
Indian Institute of Science,
Bangalore - 560 012

Director
Dr Madhu Dikshit
Director
CSIR-Central Drug Research Institute
Lucknow – 226 031

Dr K Nagarajan
Corporate Advisor,
Hikal Ltd., R & D Centre
Kalena Agrahara Bannerghatta Road,
Bangalore – 560 076

Permanent Invitee
Dr Sudeep Kumar
Head, Planning & Performance Division
Council of Scientific & Industrial
Research Anusandhan Bhawan,
2, Rafi Marg, New Delhi - 110 001

Dr R Nagaraj
Chief Scientist,
CSIR-Centre for Cellular and
Molecular Biology,
Hyderabad- 500 007

Secretary
Dr Saman Habib
Senior Principal Scientist,
Molecular & Structural Biology Division,
CSIR-Central Drug Research Institute
Lucknow – 226 031

Management Council

Chairperson

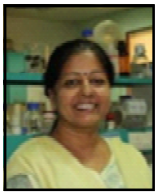
Dr Madhu Dikshit
Director
CSIR-Central Drug Research Institute
Lucknow - 226 031

Dr Ram A Vishwakarma
Director
CSIR-Indian Institute of Integrative Medicine
Jammu

Dr S Chandrashekhar
Director
Special Invited Member
CSIR-Indian Institute of Chemical Technology
Hyderabad

Mr S K Mallik
Chief Scientist
Knowledge Resource Center,
CSIR-Central Drug Research Institute
Lucknow - 226 031

Mr Vinay Tripathi
Chief Scientist
Science & Technology Management
CSIR-Central Drug Research Institute
Lucknow - 226 031



Dr Neena Goyal
Senior Principal Scientist
Biochemistry
CSIR-Central Drug Research Institute
Lucknow - 226 031

Dr Sanjay Batra
Principal Scientist
Medicinal & Process Chemistry
CSIR-Central Drug Research Institute
Lucknow - 226 031

Dr Smrati Bhadauria
Senior Scientist
Toxicology
CSIR-Central Drug Research Institute
Lucknow - 226 031

Mr H M Guniyal
Principal Technical Officer
Sophisticated Analytical Instrumentation Facility
CSIR-Central Drug Research Institute
Lucknow - 226 031

Mr A K Dwivedi
Controller of Finance & Accounts
CSIR-Central Drug Research Institute
Lucknow - 226 031

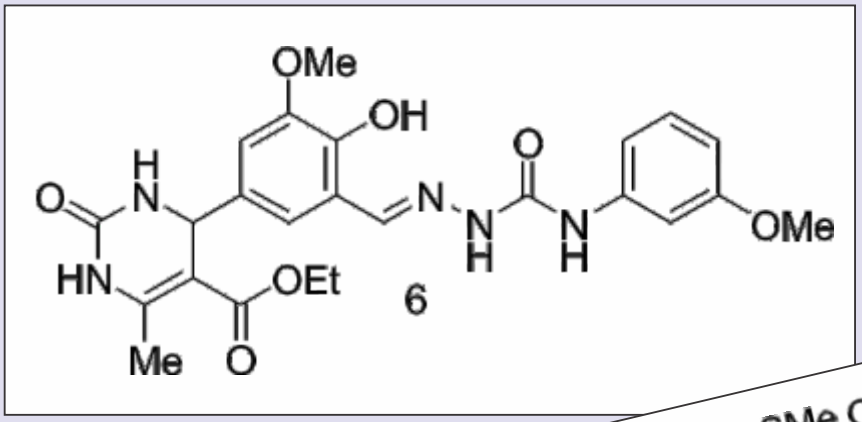
Mr C P Arunan
Controller of Administration
CSIR-Central Drug Research Institute
Lucknow - 226 031

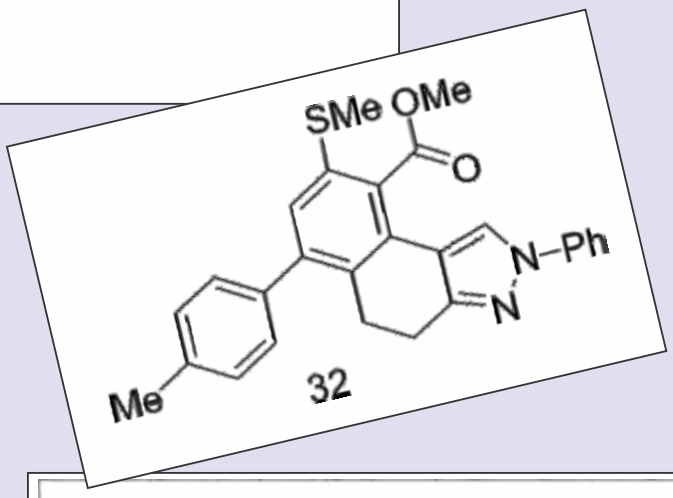
Societal Activities

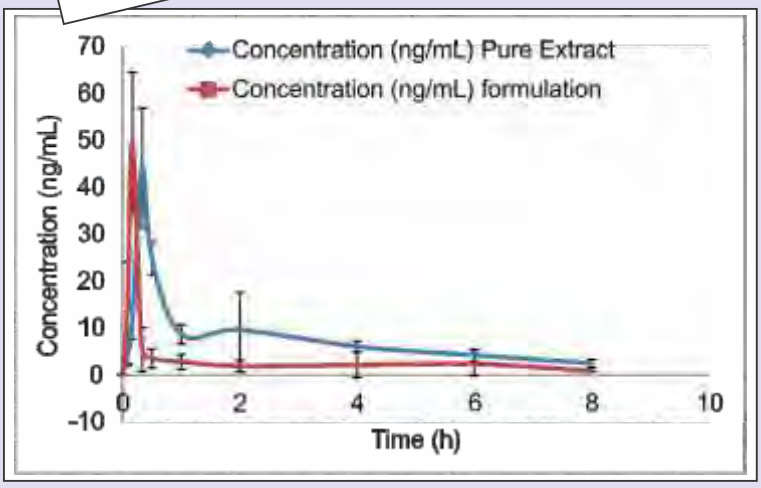
Activity	Numbers of Programs	Beneficiaries (Persons)
Health awareness programs	04	>3000
Programs for Motivation of Students and faculties at CSIR-CDRI	15	>1000
Five days special training program for rural marginal girls from Kasturba Gandhi Balika Vidyalaya, Jarbal, Bahraich (In association with Care India)	01	15
Popular Lecture by CDRI Scientist at Schools/ Colleges	05	>1200
Open-Day for public to connect common man with Institute	01	>1600
CSIR-800 exploratory societal projects initiated at rural areas under AcSIR program	16	>2000
Advance Training and skill development programs	10	>250
Technical Support in biological activity screening to universities and colleges from different areas of country	65 Samples	17 Universities

75 Years of CSIR Touching Lives

Progress in New Drug Discovery & Translational Research

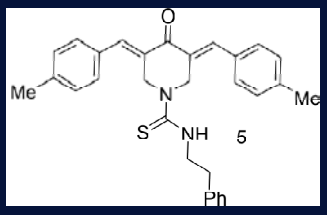






CSIR-Central Drug Research Institute, Lucknow

CSIR-Central Drug Research Institute, Lucknow



New Drug Discovery

Coordinators: Dr Sanjay Batra, Medicinal and Process Chemistry & Dr Sabyasachi Sanyal, Biochemistry

Members: Dr Imran Siddiqi, Bio-informatics; Dr Manish Chourasia, Pharmaceutics; Dr RS Bhatta, Pharmacokinetics

1

Vision and Goal

- Rational design, synthesis and biological screening of synthetic compounds and natural products for discovery of new drug
- Repositioning of bioactives
- Maintenance of the Repository of Synthetic and pure Natural Compounds for identification of ligands for new biochemical targets
- Recruiting compounds from other institutions for assessment of bioactivity

Core Competencies and Activities

- Rational design and synthesis of novel organic compounds
- Bio-evaluation of synthetic molecules and natural compounds for different disease areas via *in vitro* and *in vivo* models
- Computational approaches toward identification of new ligands for different targets
- Archiving of chemical libraries in the Repository of organic compounds
- Maintenance of records of the attributes of each compound with respect to analytical, spectroscopic and biological screening data via the *Online Compound Submission and Bioassay Reporting System* **(CBRS)**
- Maintenance of SOPs for all bioassays listed and formulation of decision trees for taking the bio-actives to translational mode
- Recruiting of organic molecules from other academic institutions for maintenance and bio-evaluation as prelude to discover new bioactives
- Analysis of PK parameters of Hits

1.1 Chemistry

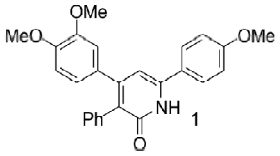
1.1.1 Single Amino Acid substitutions at specific positions of the Heptad repeat sequence of Piscidin-1 Yielded Novel Analogs that show Low Cytotoxicity and *In vitro* and *In vivo* Antiendotoxin Activity.

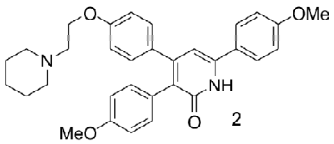
Piscidin-1 possesses significant antimicrobial and cytotoxic activities. To recognize the primary amino acid sequence(s) in piscidin-1 that could be important for its biological activity, a long heptad repeat sequence located in the region from amino acids 2 to 19 was identified. To comprehend the possible role of this motif, six analogs of piscidin-1 were designed by selectively replacing a single isoleucine residue at a δ (5th) position or at an a (9th or 16th) position with either an alanine or a valine residue. Two more analogs, namely, I5F,F6A-piscidin-1 and V12I-piscidin-1, were designed for investigating the effect of interchanging an alanine residue at a d position with an adjacent phenylalanine residue and replacing a valine residue with an isoleucine residue at another d position of the heptad repeat of piscidin-1, respectively. Single alanine-substituted analogues exhibited significantly reduced cytotoxicity against mammalian cells compared with that of piscidin-1 but appreciably retained the antibacterial and anti-endotoxin activities of piscidin-1. All the single valine-substituted piscidin-1 analogs and I5F,F6A-piscidin-1 showed cytotoxicity greater than that of the corresponding alanine-substituted analogs, antibacterial activity marginally greater than or similar to that of the corresponding alanine-substituted analogs, and also anti-endotoxin activity superior to that of the corresponding alanine-substituted analogs. Interestingly, among these peptides, V12I-piscidin-1 showed the highest cytotoxicity and antibacterial and anti-endotoxin activities. Lipopolysaccharide (12 mg/kg of body weight)-treated mice, further treated with I16A-piscidin-1, the piscidin-1 analog with the highest therapeutic index, at a single dose of 1 or 2 mg/kg of body weight, showed 80 and 100% survival, respectively. Structural and functional characterization of these peptides revealed the basis of their biological activity and demonstrated that nontoxic piscidin-1 analogs with significant antimicrobial and antiendotoxin activities can be designed by incorporating single alanine substitutions in the piscidin-1 heptad repeat. (*Antimicrob Agents Chemother*. **2016**, *60*, 3687-99)

1.1.2 Discovery of 3,4,6-triaryl-2-pyridones as potential anticancer agents that promote ROS-independent mitochondrial-mediated Apoptosis in Human Breast Carcinoma Cells

A library of 3,4,6-triaryl-2-pyridones was synthesized using multicomponent reaction (MCR) of substituted acetophenones, benzaldehydes and phenyl acetamides. All the synthesized compounds were evaluated for their anti-breast cancer activity, *in vitro* in ER+ and ER- cancer cell lines, wherein, (4-(3,4-dimethoxyphenyl)-6-(4-

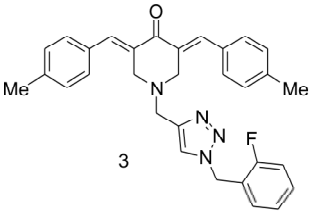
methoxyphenyl)-3-phenylpyridin-2(1*H*)-one) (1) and (3,6-bis(4-methoxyphenyl)-4-(4-(2-(piperidin-1-yl) ethoxy)phenyl)pyridin-2(1*H*)-one) (2) were found to be the most active with best safety profile towards non-cancer originated HEK-293 cells. Cell cycle analysis showed that the compounds 1 and 2 induced statistically significant arrest of cells in G1 phase and reduction in S-phase cells in a dose-dependent manner. Compound 1, unlike compound 2 exerts breast cancer cell membrane specific action as observed with LDH assay, whereas compound 2 induced ROS-independent mitochondrial-mediated apoptosis in breast cancer cell line, MDA-MB-231. Apoptotic activity of compound 2 was also confirmed by DNA fragmentation and by expression of pro-apoptotic genes, BAD, BAK, and BimL. Compound 2 was about five times safer than its effective IC_{50} values in MDA-MB-231 cell line, which makes it a non-toxic breast cancer therapeutic agent (*Chemistry Select* **2016**, *1*, 4255-4264)

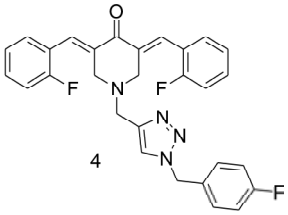




1.1.3 Synthesis and biological evaluation of novel triazole hybrids of curcumin mimics and their selective anticancer activity against breast and prostate cancer cell lines

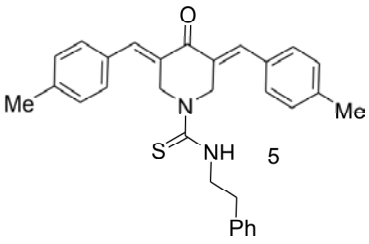
The anti-cancer property of curcumin, an active component of turmeric, is limited due to its poor solubility, stability and bioavailability. To enhance its efficacy, a series of twenty-four monocarbonyl curcumin analogue–1,2,3-triazole conjugates were synthesized and evaluated for its anti-cancer activity towards endocrine related cancers. The new compounds were synthesized through CuAAC click reaction and SAR analysis carried out. Compound **3** showed most significant anti-cancer activity against prostate cancer cells with IC_{50} values of 8.8 µM and 9.5 µM in PC-3 and DU-145 cells, respectively. Another compound **4** showed significant anti-cancer activity against breast cancer cells with IC_{50} of 6 µM, 10 µM and 6.4 µM in MCF-7, MDA-MB-231 and 4T1 cells, respectively while maintaining low toxicity towards non-cancer originated cell line, HEK-293. Compounds **3** and **4** arrested cell cycle and induced mitochondria-mediated apoptosis in cancer cells. Further, both of these compounds significantly down-regulated cell proliferation marker (PCNA), inhibited activation of cell survival protein (Akt phosphorylation), up-regulated pro-apoptotic protein (Bax) and down-regulated anti-apoptotic protein (Bcl-2) in their respective cell lines. In addition, *in vitro* stability, solubility and plasma binding studies of the compounds **3** and **4** showed them to be metabolically stable. Thus, this study identified two new curcumin monocarbonyl–1, 2, 3-triazole conjugate compounds with more potent activity than curcumin against breast and prostate cancers (*Bioorg Med Chem Lett.* **2016**, *26(17),* 4223-32)





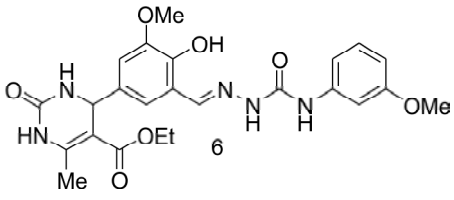
1.1.4 Discovery of monocarbonyl curcumin hybrids as a novel class of human DNA ligase I inhibitors: *in silico* design, synthesis and biology

A pharmacophore model was generated and validated by using known human DNA ligase inhibitors for the identification of a novel series of monocarbonyl curcumin–thiourea/thiazole hybrids as human DNA ligase I (hLigI) inhibitors. These compounds were synthesized and their antiligase and cytotoxic activities were evaluated *in vitro*. Several compounds from this series have shown significant inhibition of purified hLigI activity and exhibited a low micro molar range of cytotoxic activity against one or more cancer cell lines, with IC_{50} values ranging from 1.3–48.8 µM. Among these, compound **5** showed antiligase activity at an IC_{50} value 24.9 ± 1.8 µM, and selective cytotoxicity against DLD1 cancer cell line (IC_{50} value 8.7 ± 1.9 µM) compared to the reference curcumin (IC_{50} values were 51.9 ± 8.7 µM and 33.2 ± 1.8 µM for antiligase and cytotoxic activities against DLD1 cell line, respectively), and docking studies showed considerable interactions of compound **5** with hLigI. This new class of potent hLigI inhibitors will serve as a potential lead for further optimization and drug development. (*RSC Adv.* **2016,** *6*, 26003-26018)



1.1.5 Design, synthesis and anticancer activity of dihydropyrimidinone–semicarbazone hybrids as potential human DNA ligase 1 inhibitors

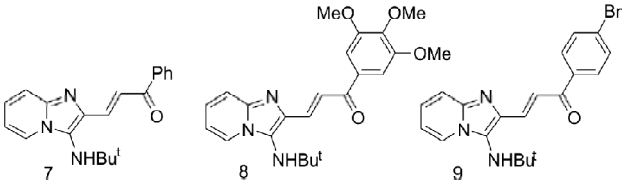
A series of new dihydropyrimidinone–semicarbazone hybrids were successfully synthesized by integrating regioselective multicomponent reaction with the pharmacophore hybridization approach. All the synthesized compounds were evaluated for their hLig1 inhibition potency and most of them were found to be good to moderately active. Out of the tested derivatives, compound **6f** showed selective anti-proliferative activity against HepG2 cells in a dose-dependent manner with an IC_{50} value of 10.07 ± 1.2. It also reduced cell survival at ≤ 20 µM concentration. Further, analysis of treated HepG2 cell lysates by western blot



assay showed increased γ-H2AX levels and upregulation of p53, leading to apoptosis. *In silico* docking results explain the binding modes of compound **6** to the DNA-binding domain of hLig1 enzyme thereby preventing its nick sealing activity. In addition, the favourable pharmacokinetic properties suggest that this new class of hLig1 inhibitors could be promising leads for further drug development. (*Med. Chem. Commun*. **2016**, *7*, 2349-2363)

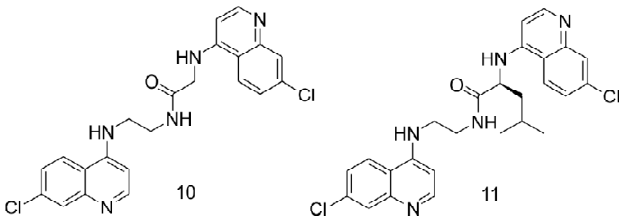
1.1.6 Synthesis of pyrido[1,2-a]imidazo-chalcone via 3-component GroebkeBlackburn-Bienayme reaction and their bioevaluation as potent Antituberculosis Agents

A series of novel pyrido[1,2-*a*]imidazo-chalcones were synthesized and evaluated for their anti-tubercular activity against *Mycobacterium tuberculosis* H37Rv strain and further their cytotoxicity in Vero cells (C1008) and mouse bone marrow derived macrophages (MBMDMx) was assessed. Among all tested compounds, **7**, **8**, and **9** were found to be the most active with MIC values 7.89, 6.42 and 6.59 µM, respectively, which is better than the standard drugs ethambutol (MIC = 9.78 µM) and pyrazinamide (MIC = 101.53 µM) with no toxicity. (*Chem. Bio. Interface* **2016**, *6*(*5*), 290-299)



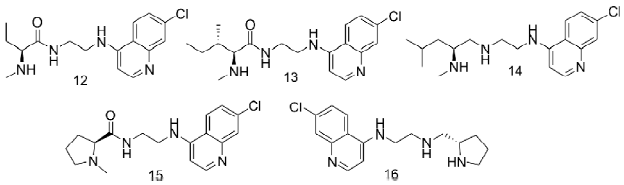
1.1.7 Design, Synthesis and in-vitro Antiplasmodial activity of Some Bisquinolines against Chloroquine Resistant Strain

A series of novel bisquinoline compounds comprising, N^1-(7-chloroquinolin-4-yl) ethane-1,2-diamine and 7-chloro-N-(2-(piperazin-1-yl)ethyl)quinolin-4-amine connected with 7-chloro-4-aminoquinoline containing various amino acids were prepared and assessed for their antiplasmodial effect against both chloroquine-sensitive (3D7) and chloroquine-resistant (K1) strains of *P. falciparum in vitro*. Among the series, compounds **10** and **11** exhibited 1.8 and 10.6-fold superior activity as compared to chloroquine (CQ) (IC_{50} = 0.255±0.049 µM) against the K1 strain with IC_{50} values 0.137±0.014 and 0.026±0.007 µM, respectively. Furthermore, compound **11** also displayed promising activity against the 3D7 strain (IC_{50} = 0.024±0.003 µM) of *P. falciparum* when compared to CQ. All the compounds in the series displayed resistance factor between 0.57 and 4.71 as against 51 for CQ. The results suggested that bisquinolines can be explored for further development as new antimalarial agents active against chloroquine resistant *P. falciparum*. (*Chemical Biology & Drug Design* **2017,** online 27th Jan, DOI: 10.1111/cbdd.12914)



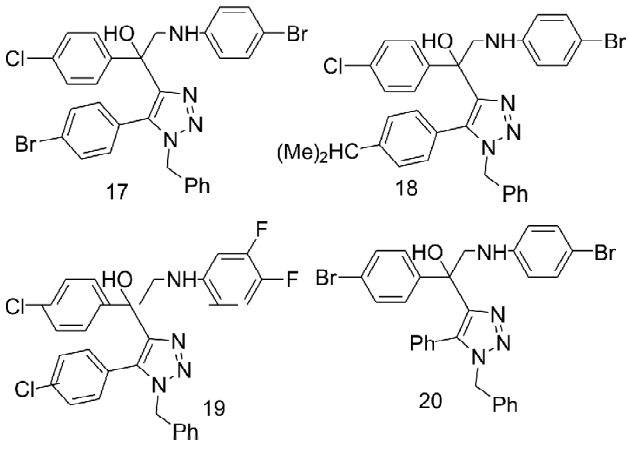
1.1.8 Design, synthesis, and *in-vitro* Antiplasmodial activity of 4-aminoquinolines containing modified amino acid conjugates

A new series of side chain-modified 4-aminoquinolines were synthesized and screened for *in vitro* antiplasmodial activity against both CQ-sensitive (3D7) and CQ-resistant (K1) strains of *P. falciparum*. Among the series, compounds **12** and **13** showed significant inhibition of parasite growth against K1 strain of *P. falciparum* with IC_{50} values 0.28 and 0.31 µM, respectively, whereas compounds **14, 15**, and **16** exhibited superior activity against K1 strain with IC_{50} values 0.18, 0.22, and 0.17 µM, respectively, as compared to 0.255 µM for chloroquine (CQ). All the compounds displayed good resistance factor between 1.54 and >34.48 as against 51.0 for CQ. All these analogues were found to form strong complex with hematin and inhibited the â-hematin formation *in vitro*, suggesting that this class of compounds act on a heme polymerization target. Overall results suggest that present series of compounds appear to be promising for further lead optimization to obtain compounds active against drug-resistant parasites. **(***Med. Chem. Res***. 2016,** *25*, 1148–1162)



1.1.9 Identification of β-Amino alcohol grafted 1,4,5 trisubstituted 1,2,3-triazoles as potent antimalarial agents

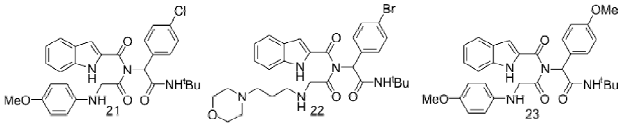
A series of novel β-amino alcohol grafted 1,2,3-triazoles were synthesized and screened for their *in vitro* antiplasmodial and *in vivo* antimalarial activity. Among them, compounds **17** and **18** showed potent activity against CQ-sensitive (3D7) strain with IC_{50} of 0.87 and



0.3 µM, respectively, while compounds **19** and **20** exhibited better activity in vitro than the reference drug against CQ-resistance strain (K1) with IC_{50} of 0.5 µM each. Compound **22** showed 86.8% *in vivo* antimalarial efficacy with favorable pharmacokinetic parameters. Mechanistic studies divulged that potent compounds significantly boosted p53 protein levels to exhibit the antimalarial activity. (*Eur J Med Chem*. **2016**, *109*,187-198)

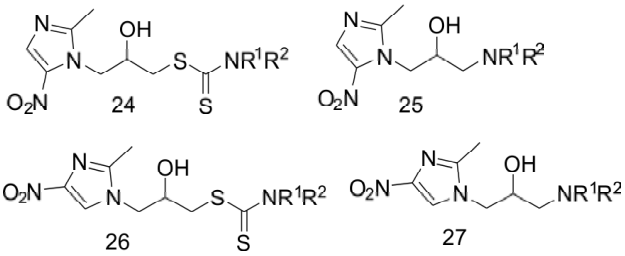
1.1.10 Identification of a diverse indole-2-carboxamides as a potent antileishmanial chemotypes

A novel series of highly diverse indole-2-carboxamides, synthesized utilizing the isocyanide based multicomponent reaction (IMCR)-post modification approach was identified to be a potential antileishmanial chemotype. The synthesized analogues exhibited significant antileishmanial activity against intracellular amastigotes form of *Leishmania donovani* (IC_{50} values of 0.6-7.5 ìM) as compared to standard drugs miltefosine and sodium stibogluconate. The compounds were also non-toxic towards Vero cells. Compounds **21-23** with significant *in vitro* activity were then evaluated for their *in vivo* efficacy following intraperitoneal route. These three compounds at a concentration of 50 mg/kg/day for 5 consecutive days showed 70.0, 63.5 and 63.4% inhibition of Leishmania amastigotes, respectively at day 7 post treatment in hamster model of visceral leishmaniasis. (*Eur J Med Chem***. 2016**,*110*, 237-245)



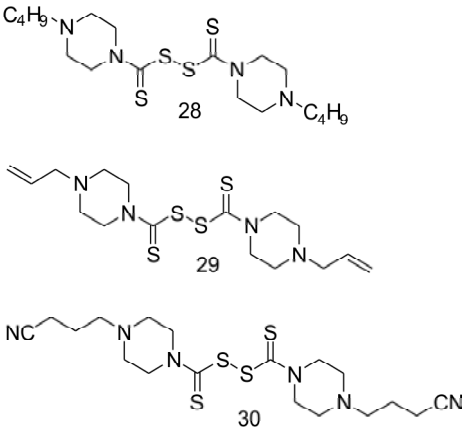
1.1.11 2-Methyl-4/5-nitroimidazole derivatives potentiated against sexually transmitted Trichomonas: Design, synthesis, biology and 3D-QSAR study.

Trichomoniasis is the most prevalent, non-viral sexually transmitted diseases (STD) caused by a mitochondriate protozoan *Trichomonas vaginalis*. Increased resistance of *T. vaginalis* to the marketed drug Metronidazole necessitates the development of newer chemical entities. A library of sixty 2-methyl-4/5-nitroimidazole derivatives was synthesized via nucleophilic ring opening reaction of epoxide and the efficacies against drug-susceptible and -resistant *T. vaginalis* were evaluated. All the molecules except two were found to be active against both susceptible and resistant strains with MICs ranging 8.55-336.70 µM and 28.80-1445.08 µM, respectively. Most of the compounds were remarkably more effective than the standard Metronidazole. This study analyzed the *in vitro* and *in vivo* activities of the new 5-nitroimidazoles, which were found to be safe against human cervical HeLa cells with good selectivity index. The exploration of SAR by the synthesis of four different prototypes (25-27) and 3D-QSAR study show the importance of 24 over other prototypes 25-27. (*Eur J Med Chem*. **2016**, *124*, 820-839)



1.1.12 Role of disulfide linkage in action of bis(dialkylaminethiocarbonyl)disulfides as potent double-Edged microbicidal spermicide: Design, synthesis and biology

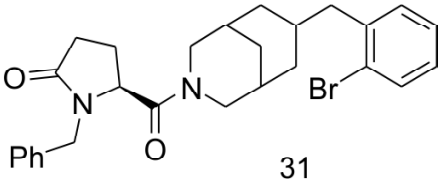
Trichomoniasis and candidiasis are amongst the most common morbidity-causing reproductive tract infections, generally treated by Metronidazole and Fluconazole respectively. Poor vaginal efficacy, drug-resistance and non-spermicidal nature limit their use as topical microbicidal contraceptives. Bis (dialkyl-aminethiocarbonyl) disulfides were designed as dually active, non-surfactant molecules capable of eliminating *T. vaginalis* and Candida strains as well as irreversibly immobilizing 100% human sperm instantly, at doses non-cytotoxic to human cervical epithelial cells and vaginal microflora *in vitro*. Compounds **28-30** were fifty times more active than nonoxynol-9, OTC vaginal spermicide, and compounds 14 and 16 have shown remarkable *in vivo* activity in rabbit model. Most promising compound **16** showed promise for further development as a double-edged vaginal microbicide due to their improved activity and safety along with notable *in vivo* trichomonicidal activity. Role of disulfide group was established by loss of spermicidal activity on chemical modifications wherein the sulfides were not present. These disulfides might be targeting thiol groups present over cell membrane of human sperm and Trichomonas as shown by fluorescence labeling of free thiols. (*Eur J Med Chem*. **2016**, *115*, 275-90.)



1.1.13 Synthesis and evaluation of dual antiplatelet activity of bispidine derivatives of *N*-substituted pyroglutamic acids

N-aralkylpyroglutamides of substituted bispidine were prepared and evaluated for their ability to inhibit

collagen induced platelet aggregation, both *in vivo* and *in vitro*. Some compounds

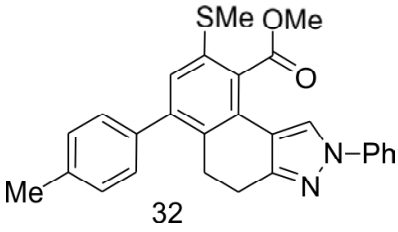


31

showed high anti-platelet efficacy (*in vitro*) of which six inhibited both collagen as well as U46619 induced platelet aggregation with concentration dependent anti-platelet efficacy through dual mechanism. In particular, the compound **31** offered significant protection against collagen epinephrine induced pulmonary thromboembolism as well as ferric chloride induced arterial thrombosis, without affecting bleeding tendency in mice. Therefore, the study suggested that **31** displays a remarkable antithrombotic efficacy much better than aspirin and clopidogrel. (*Eur J Med Chem*. **2016**, *110*, 1-12)

1.1.14 Synthesis of substituted 2*H*-benzo[*e*]indazole-9-carboxylate as a potent antihyperglycemic agent that may act through IRS-1, Akt and GSK-3â pathways

Employing certain 4,5-dihydro-2*H*-benzo[*e*]indazole derivatives, which displayed a significant effect on glucose uptake in L6 skeletal muscle cells, a series of benzo[*e*]indazole derivatives were prepared. Among all the synthesized dihydro-2*H*-benzo[*e*]indazoles, 8-(methylthio)-2-phenyl-6-*p*-tolyl-4,5-dihydro-2*H*-benzo[*e*]indazole-9-carboxylate (**32**) showed significant glucose uptake stimulation in L6 skeletal muscle cells, even better than lead



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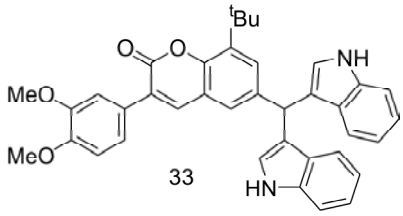
compounds. Additionally, **32** decreased glucagon-induced glucose release in HepG2 hepatoma cells. The 2*H*-benzo[*e*]indazole **32** exerted an antihyperglycemic effect in normal, sucrose challenged streptozotocin-induced diabetic rats and type 2 diabetic *db*/*db* mice. Treatment with **32** at a dose of 30 mg kg^{-1} in *db*/*db* mice caused a significant decrease in triglyceride and total cholesterol levels and increased the HDL-C level in a significant manner. The mechanistic studies revealed that the 2*H*-benzo[*e*] indazole **5e** significantly stimulated insulin-induced signaling at the level of IRS-1, Akt and GSK-3β in L6 skeletal muscle cells, possibly by inhibiting protein tyrosine phosphatase-1B. This new 2*H*-benzo[*e*]indazole derivative has potential for the treatment of diabetes with improved lipid profile. (*Med. Chem. Commun*. **2017,** web released15 Nov 2016 DOI: 10.1039/C6MD00467A)

1.1.15 Hybrids of coumarin–indole: design, synthesis and biological evaluation in Triton WR-1339 and high-fat diet induced hyperlipidemic rat models

In this study, a series of coumarin–indole hybrids have been synthesized and evaluated for their lipid lowering activity. Preliminary biological screening of the synthesized compounds was undertaken in an *in vitro* model of the HMG-CoA reductase enzyme, and the activity was confirmed in Triton WR-1339 induced hyperlipidemic rats. Among the hybrids, compound **33** was found to be the best as it significantly reduced the serum and hepatic lipid profiles in an HFD-



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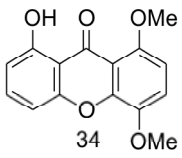
fed hyperlipidemic rat model. The mechanism of action seems to be associated with the regulation of HMG-CoA reductase activity in the liver, which is in good agreement with binding mode studies. Compound **33** exhibited favorable pharmacokinetic behavior for its oral administration, which underscores the potential of this template as a new class of hypolipidemic agents. (*Med. Chem. Commun*. **2016**, *7*, 1858-1869)

1.1.15 New Xanthone from the roots of *Swertia cordata* (G. Don) Clarke

The chloroform extract of *Swertia cordata* (G. Don) roots was subjected to column chromatography, afforded two (one new and one known, **34** and **35**) xanthones. Both the compounds were isolated for the first time from *S. cordata*. The structures of the isolated compounds were established on the basis of melting point,1D (1H NMR & ^{13}C NMR) and 2D (^{1}H ^{1}H COSY, HSQC & HMBC) NMR spectroscopy, in addition to



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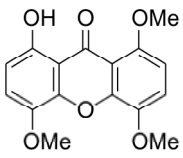

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high-resolution mass spectrometry. **(***Nat Prod Res***. 2017,** *31(2)***,** 155–158)

1.1.16 Anti-inflammatory flavanol glycosides from *Saraca asoca* bark

Saraca asoca (Roxb.) de Wilde, a common tree of India, is popularly used in the Ayurvedic and modern herbal systems of medicine for genito-urinary problems of women. Considering the reported antimicrobial or anti-inflammatory effect of *S. asoca* bark against such infections, we studied the anti-inflammatory activity-guided isolation of active compounds from methanol extract. The methanol extract of bark yielded 10 compounds out of which 3'-deoxyepicatechin-3-O-β-D-glucopyranoside (and 3'-deoxycatechin-3-O-α-L-rhamnopyranoside were found to be active *in vitro* and *in vivo*. 3',5-Dimethoxy epicatechin, 3'-deoxyepicatechin-3-O-β-D-glucopyranoside, 3'-deoxycatechin-3-O-α-L-rhamnopyranoside and epigallocatechin were reported for the first time from *S. asoca*. (*Nat Prod Res*, **2016**; *30(4),* 489-92)

1.2 Biological Screening

1.2.1 Tuberculosis and Microbial Infection

1.2.1.1 Antibacterial and Antifungal evaluation of compounds

A total of 963 (under CBRS/synthetic 669, MoES 270, peptides 23 and plants 1) compounds/extracts were evaluated for *in vitro* antifungal and antibacterial activity by micro broth dilution method using standard protocol (as per CLSI guide lines) initially against 7 human bacteria viz. *1. E. coli* (ATCC 9637), *2. Pseudomonas aeruginosa* (ATCC BAA-427), 3. *Staphylococcus aureus* (ATCC 25923), 4. *Klebsiella pneumoniae* (ATCC 27736), 5. *S. aureus* (ATCC 700699 MRSA), *S. aureus* (ATCC 29213), *S. aureus* (ATCC 33592 Gentamycin resistant) and six human fungi viz. 1. *Candida albicans,* 2. *Cryptococcus neoformans,* 3. *Sporothrix schenckii, 4. Trichophyton mentagrophytes, 5. Aspergillus fumigatus* and 6. *Candida parapsilosis* (ATCC-22019).

The synthetic compounds, S015-2170-2175, -2179, -2180, S015-2182-2186 (MIC 0.19-3.12 µg/ml) exhibited antibacterial activity against *S. aureus* (including resistant) strains. Among MoES compounds MSR/CDRI-5/1 to 22 and -24 exhibited *in vitro* activity against the tested strains of *S. aureus* in the range of 0.01-6.25 µg/ml whereas the synthetic peptides were found to be active against the fungi as well as bacteria (MIC 3.12-50 µg/ml. The marine compound MSR/CDRI 5/05 when evaluated against *S. aureus* (ATCC 700699) challenged BALB/c mice using vancomycin as standard drug control did not exhibit any promising activity.

A total of 549 compounds belonging, triazole, Quinoline-triazole hybrid, Tacrine, Benzofuran-tetrazole, Isoxazole, Carboline, Dihydropyridine, Indoleamide, Purine nucleoside, Isatin, phenothiazine, stilbene, Distyrylbenzenes, Indoles, Pyrazole, triazoline, Bipyridyl class were prepared and screened against ESKAPE pathogens. Unfortunately, no compound displayed any significant bioactivity.

Sepsis is often associated with multi-organ failure resulting in high mortality of patients. Despite huge efforts, a proper treatment of sepsis is yet to be made available to the patients making it an important area of research for drug development. Towards this objective, a series of 15-residue novel leucine-arginine rich peptides were designed on the basis of heptad repeat sequence with single/double proline residue(s) in its one or two strategic position(s); one of these designer peptides with proline at its 8-position, S-016-1271 showed negligible cytotoxicity but significant anti-microbial and anti-endotoxin activities. It showed very potent activity against MRSA strains and fungi and retained its antimicrobial activity in presence of serum and sodium/potassium salts at their physiological concentrations. Further, this peptide also exhibited appreciable *in vivo* anti-microbial and anti-endotoxin activities in mice. A patent application has been filed already. PK/PD studies with this peptide are under progress now.

1.2.1.2 Anti-tubercular screening

More than 1200 compounds were screened against *M. tuberculosis* to discover new antitubercular agents. These compounds belong to several chemical classes including stilbene, imidazo[1,2-*a*]pyridine, isoxazole, quinolone, β-carboline. Only 15 compounds displayed inhibitory activity at MIC of 6.25 µM but none of the compound was found to be active below this dose.

1.2.2 Parasitic Infections

1.2.2.1 Anti-Plasmodial Screening

***Synthetic compounds* (*in vitro*)**

During the reporting period approximately 863 novel compounds, synthesized at the institute and 16 plant extracts received from various academic organizations across the country, were screened against the human malaria parasite, *P. falciparum* for their anti-plasmodial efficacy. The 715 synthetic molecules belonging to diverse chemical classes including oxindoles, sulfonyltriazoles, nucleosides, benzothiazoles, pyrimidindiones, deoxybenzoins, isoflavones, pterocarpans; deoxybenzoins; benzimidazoles, 6-aryl-pyranones, pyrazolopyridine; isoxazole, nitroso-imidazo-pyridines, benzo-imidazothiazole, indole ester, pyrazoline-ester, biaryllactam, Quinolinecarboxylate, β–Carboline derivatives; pyrrolopyrazolone, Canthinone derivatives, propargylamines, triazolopyridines, *N*-(1-phenylethyl)acetamide, imidazolidine-2,4-dione, indolizino-indole, chloro-dihydroxy-hexenes, pyrroles, pyrroloindole, imidazolidines, tacrine derivatives, benzofuran-tetrazole hybrids, triazolyl-purines and tetrahydropyridine. Besides nucleosides, malonamate, fluoroamides, phthalimidoquinoline, 8-amidoquinoline, Adenine conjugates, cyclopropyl phenylmethyl derivatives, indoleamide-triazole and sulphonamide conjugates, β-amino alcohol grafted 1, 2, 3-triazoles, glycosylated amino esters, and stilbenes were also screened.

Six molecules belonging to stilbenoid, isoxazoles, and Quinoline-carboxylate classes were identified as hits exhibiting IC_{50} values between 60 and 150 nm against CQ-sensitive strain (3D7) and between 40 and 500nm against CQ-resistant (K1) *P. falciparum* strain. Apart from this 34 compounds belonging to Nitroso-imidazopyridine; β-carboline; isoxazole- quinolone conjugate, Glycosylated amino estersand stilbenoid classes exhibited IC_{50} values between 200nM and 1µM against both 3D7 and K1 strains. These molecules were also evaluated for cytotoxic profile against vero cell line

Natural product Screening (*in vitro*)

28 water and ethanol extracts from fourteen plants (*Arnebia benthami*, *Berberis lyceum*, *Boerhavis diffusa*

+ *Curcubita pepo*, *Desmodium triflorum, Cleome gynandra, Buchanania lanzan*, *Fagonia cretica*, *Actiniopteris dichotoma*, *Prosopis cineraria, Capparis cartilaginea*, *Epipremnum aureum (L.), Hydrocotyle rotundifolia*, *Eragrostis tenella* and *Teramnus labialis)* were received from National Innovative foundation, Ahmedabad (NIF) and five extracts from National Institute of Ocean Technology, Chennai (NIOT). All these extracts were tested for their antimalarial activity against CQ-sensitive (3D7) and CQ-resistant (K1) strains of *P. falciparum*. Promising antiplasmodial activity was discovered in the extracts from two plants, *Actiniopteris dichotoma*, IC_{50} against 3D7= 5.85 µg/mL (ethanol extract) and K1 = 6.41 µg/mL and *Eragrostistenella*, IC_{50} against 3D7 =4.52 µg/mL, (ethanol extract), K1= 5.8 µg/mL. Other plant extracts namely 2EE, 11EE, 12EE, 15EE and111WE showed moderate activity against *Pf* 3D7 whereas 2EE, 3EE, 7EE, 10EE and 15EE displayed mild activity against *Pf*K1. One of the extracts OC II2a from NIOTshowed promising antimalarial activity with IC_{50} = 0.17 µg/mL and 0.63 µg/mL against *Pf*3D7 and *Pf*K1, respectively. Cytotoxicity study with extracts showed good therapeutic indices.

***In vivo* Screening**

6 compounds displaying promising *in vitro* efficacy were assessed for *in vivo* effect against MDR *P. yoelii nigeriensis* in Swiss mice. However, none of the compounds show curative effect. On the other hand, ten NIF extracts were also evaluated in same experimental conditions but none of them displayed any promising effect.

1.2.2.2 Anti-Leishmanial Screening

Novel synthetic moieties representing several prototypes viz. Isoxazoles, pyrazoles, indoles, Imidazolidinedione, quinolines, quinolones, β-carbolines, phenothiazine, pyrazolopyridines, pyrazole- chalcone, 4 amino-adenine, allyl alcohols, β-amino acid, canthionone derivatives, phosphonylated dihydroxynapthalene, isoinolole-1-carboxamide , phenylbenzamide, substituted chromones, piperazines and tetrazoles, triazines, ally alcohols, benzodiazepinone, purine based derivative were synthesized and screened for antileishmanial activity against *in vitro* experimental models. A total of close to 300 synthetic compounds were evaluated at 50 µM and 25 µM concentrations against *in* vitro macrophage-amastigote model out of which 25 compounds exhibited IC_{50}<10 βM and SI >5. From the list, 15 compounds were evaluated for the *in vivo* activity but none of the compounds showed potent antileishmanial activity in in *L. donovani* golden hamster model hamster model.

1.2.2.3 Anti-fliarial Screening

A total of 144 compounds belonging to various chemical classes including Chroman, Tetrazole, Indole Nucleosides Sulfonyl Triazole, and Oxyaminomalonamates were synthesized and screened for their anti-filarial activity, however, none of them fared equal to, or better than the standard drug Ivermectin that was used in Motility assay *in vitro*.

1.2.3 CNS, CVS and Related Disorders

A total of 145 synthetic compounds and 25 natural extracts/fractions were taken up for screening against several GPCRs target. This included screening at D5 receptor, 5-HT6 (being targeted for development of NCEs for Cognition enhancements) and 5HT2C and histamine H3 receptor (targeted for development of NCEs for obesity), Kappa Opioid receptor (targeted for development of NCEs for depression). Although no synthetic compound displayed potential effect as D5 receptor antagonist, three natural extracts 135/C001 (Agonist; $EC_{50} \leq 1.62$ µg/mL); 135/F001 (Agonist: $EC_{50} \leq 0.47$ µg/mL) & 135/F002 (Agonist: $EC_{50} \leq 1.43$ µg/mL) showed some effect. Whereas no compound showed activity for the 5-HT6 receptor, S-016-0867 (PAM: $pEC_{50} \leq 6.3$) showed good efficacy for the 5-HT2C receptor. On the other hand, out of 145 compounds, 5 compounds (S016-0618 (Anta: pEC50 $\leq$ 5.7), S016-0759 (Anta: $pEC_{50} \leq 5.6$), S016-1072 (Anta: $pEC_{50} \leq 5.5$), S016-1074 (Anta: $pEC_{50} \leq 5.3$), S016-1268 (Anta $pEC_{50} \leq 5.0$)) displayed modest antagonist effect.

Out of 105 compounds received for the assessment of anti-inflammatory activity, a few hits were identified, which are being validated further for confirmation of activity. For the identification of new anti-dyslipidemic agent, 87 compounds were screened for the PCSK9 inhibitor activity. Based on the results of the docking studies and *in vitro* assay, two compounds are identified for detailed evaluation.

1.2.4 Endocrine Disorders and Bone health

1.2.4.1 GLP-1R receptor antagonist

114 compounds belonging to Pyrazol-pyridine, Amino-imidazopyridinamide and Amino-oxindole classes were screened for their ability to modulate human glucagon like peptide-1 receptor (GLP-1R). However, none of the compounds were found to induce the receptor activity.

1.2.4.2 Bone-Healing assay

A total of 70 compounds belonging to isoxazole-chalcone, pyrazole-chalcone, β-amido, Pterocarpans, Isoflavones and Isoindolones were synthesized and screened for Alkaline Phosphatase (ALP) activity in osteoblast cells. Four compounds (S-015-2363 (EC_{50} 20nM), S-016-0736 (EC_{50} 0.136nM), S-016-0737 (EC_{50} 0.3nM), S-016-0746 (EC_{50} 10pM) active in ALP assay were further checked for their efficacy in mineral nodule formation assay by Alizarin staining method. One of the compounds. One of the compounds is being studied in detail to validate its bio-efficacy.

1.2.5 Reproductive Health Research and Contraception

1.2.5.1 Spermicides with anti-STD activity

Transmission of sperm and *T vaginalis* during coitus results in unintended pregnancies and the common STD, Trichomoniasis. During period under report novel scaffolds were designed for dual (spermicidal and anti-trichomonal) activities targeting sufhydryl groups present over sperm and *Trichomonas*, 15 compounds were designed as *N*-ethyl maleimide (a well-known thiol binding agent) derivatives and screened *in vitro*. One promisingly active molecule (S016-416) was identified. On the other hand, 23 compounds synthesized as dialkyl dithiocarbamate derivatives failed to show any significant biological activity under the bioassay.

1.2.6 Anticancer screening

1.2.6.1 Phenotypic screening

More than 500 synthetic compounds and 65 plant extracts were screened in three different cancer types (Breast, Colon, and Lung) in 6 representative cell lines. Two different cell lines (one metastatic and another non-metastatic) were selected for each cancer type. Around 17 synthetic compounds and 6 plant extracts showed some promise in the initial screening and they are being pursued in details for ascertaining the bioactivity and taking them for in vivo stage.:

1.2.6.2 Target based screening for mTOR pathway inhibitors

Using *in-vitro* mTOR Kinase assay (non-radioactive, antibody- based detection method), nine in-house compounds were screened for mTOR kinase inhibitory potential. One compound was found effective in inhibiting mTOR Kinase activity *in vitro* i.e recombinant mTOR kinase expressed in insect bacculosomes and immune purified mTOR complexes harvested from MDA-MB-231 breast cancer cells.

1.3 Hit to Lead Optimization Program

1.3.1 Novel Oral Combination Formulation as Platform Technology for Malaria

The project aims to develop process-cum-product technology packages for oral combination formulation containing sulfadoxine-pyrimethamine and a/b arteether for the management of various medical indications associated with malaria in humans and animal such as *P. falciparum, P. vivax,* MDR *P. falciparum,* XDR *P. falciparum,* MDR- *P. vivax,* XDR *P. vivax,* for a period of two to five days schedule and process of preparation of this formulation.

In the studies carried out during the year, it was observed that 100% curative effect with nearly one fourth of curative dose of α/β-arteether in combination with formulation. This study indicated a synergism between the proposed two drugs. This combination in SMEDDS can be given orally. This is likely to reduce the toxicity of individual drugs, if any, as their dose in combination is drastically reduced.

1.3.2 Optimization of Identified Inhibitors of Drug-resistant *Staphylococcus aureus* (MRSA)

The project aims optimization of couple of compounds belonging to stilbene class with novel mode of action which are potentially active against MRSA. During the year, synthesis and SAR of 54 compounds was carried out but no compound was found to be better than initial hits. Study showed that original compounds exhibit SI of at least 25 & are non-haemolytic. Time-Kill kinetic study showed that both the compounds are bactericidal. *In vivo* activity found to be comparable to vancomycin. Pharmacokinetic studies with these compounds are in progress.

1.3.3 Design of Novel Antimicrobial and Anti-endotoxin Peptides for the Development of new Anti-infectives

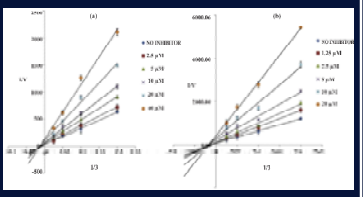
In this project, a 15-residue novel peptide, S-016-1271 was developed which is appreciably non-cytotoxic to human RBCs and murine 3T3 cells and possesses significant antimicrobial and anti-endotoxin activities. The peptide retains its antibacterial property in serum and physiological salts. The peptide is highly active against both Gram-positive and Gram-negative bacteria, fungi (*Candida albicans, Cryptococcus neoformans*, *Candida parapsilosis)* and Methicillin, gentamicin and multidrug resistant strains of *S. aureus*. Treatment of this peptide (single dose of 7 mg/kg) to mice administered with *P. aeruginosa* (ATCC BAA-427) showed 60% survival indicating appreciable efficacy of this peptide in rescuing mice against this bacterial infection.

1.3.4 Drug Repurposing for Management of Post-menopausal Osteoporosis

By screening a drug library consisting of U.S. FDA approved drugs (1,300 compounds), discovered that two drugs have osteogenic, anti-osteoclastogenic and fracture healing effects. These new activities are being evaluated in details for their efficacy in preclinical models of post-menopausal osteoporosis for which indication the drugs will be positioned. Efficacy of both the drugs in rat model for fracture healing and Modeling-directed bone formation has been established.

1.3.5 Repurposing of FDA approved drugs for Chronic & Acute Myeloid Leukemia (CML& AML)

Following a primary screen for anti-CML and anti-AML (cytotoxic) effects of 800 FDA-approved drugs, a drug has been identified which induced remarkable cell death in CML and AML cell lines. Further studies were taken up for Repurposing FDA-approved drug for treatment of chronic myelogenous leukemia (CML) and acute myelogenous leukemia (AML). Efficacy of the drug has been established in leukemia stem cells from drug resistant patients. Mechanism by which drug induces apoptosis and differentiation in AML cells has been elucidated.



Translational Research

Chairperson: Dr Madhu Dikshit, Director, CSIR-CDRI

Members: Dr Ashim Ghatak, Clinical & Experimental Medicine; Dr AK Dwivedi, Pharmaceutics; Dr Naibedya Chattopadhyay, Endocrinology; Dr W Haq, Medicinal & Process Chemistry; Dr Jawahar Lal, Pharmacokinetics; Dr Sharad Sharma, Toxicology; Dr SK Rath, Toxicology; Dr Amit Misra, Pharmaceutics; Dr MK Barthwal, Pharmacology.

2

1. Pharmaceutics
2. Pharmacokinetics and metabolism
3. Regulatory Toxicology
4. Safety Pharmacology
5. Clinical & Experimental Medicine

1. Pharmaceutics

The following activities were undertaken in addressing Translational Research on candidate drugs from CSIR-CDRI, and on novel formulations for known drugs.

1.1 Generation and Compilation of Data Required for Investigational New Drug (IND) Application

Chemistry, Manufacturing and Controls data for compounds 99/373 and 97/78 were compiled for presentation before the IND Committee of the CDSCO. These applications were approved on 15 December 2016 by the Drugs Controller General of India. An analytical method was development and validated for impurity profiling of CDRI 99/373 in conformity with requirements of Schedule Y of the Drugs and Cosmetics Act. Using this method, pre-formulation studies were conducted. The partition coefficient (log P), compatibility with excipients, and data on forced degradation via oxidative, acid and base hydrolysis were generated.

A “ready to fill” powder was prepared for filling into capsules. Drug content (Assay or Label Claim), dissolution rates of the candidate drug at pH 1.2 and pH 6.8, products of forced degradation in the formulation were established.

Data for CSIR-CDRI Compound S-006-867 was compiled for IND application.

1.2 Pharmaceutical Analysis

New HPLC analytical methods were developed for the following 26 compounds: S-015-0862, S-013-0431, Compound- 6 (CRI. No. 93143), S-015-0072, S-015-1041, K080 (Marker compound), S-012-1051, S-011-1992, S-015-1149, S-007-1097, S-007-1098, S-014-0829, S-012-241, S-015-0072, S-015-816, S-015-728, S-015-0480, S-015-2448, S-013-1593, S-013-0305, S-016-0969, S-016-0970, S-016-1044, S-016-1045, S-014-367, S-014-233.

Methods for impurity profiling of S-002-333 and 99/373 were also developed and validated.

A total of 110 CSIR-CDRI candidate drug samples including synthetic compounds, plant extracts and industrial production batches were analyzed for purity. In addition, >2200 samples were analyzed for drug content, drug release, stability and impurity profiling in formulation development activities. The average time from receipt of sample to filing an analytical report this year was 10.3 days, rising from 9.2 days reported last year wherein the workload was significantly lesser.

1.3 A new chemotype of *Withania somnifera* (Ashwagandha, NMITLI118RT+)

Fingerprints of diverse chemical constituents were established and simultaneous estimations of Withanolide A and Withanone by HPLC and HPTLC was accomplished. Quantitative estimations of major constituents were attempted via UHPLC-MS analysis. MS-DART analysis of NMITLI118RT+ was performed along with determination of its antioxidant potential. PLGA nanoparticles loaded with NMITLI118RT+ were developed and characterized for entrapment efficiency, in vitro release, compatibility with formulation excipients and surface morphology by Atomic Force Microscopy. In vitro cytotoxicity towards MDA-MB 231 and PC-3 cancer cell lines via oxidative stress-mediated apoptosis were investigated.

1.4 A standardized hexane-soluble fraction derived from *Curcuma longa* (HM)

Major marker compounds; Ar turmerone, ±, β turmerone, and curlone of about 98% purity were separated from HM oil using preparative HPLC. An HPLC analysis method was developed and validated for estimation of marker compounds in HM.

1.5 NCCL (Chemically modified HM)

Marker compounds were identified and separated, their structures were confirmed by spectrometric procedures and pharmacokinetic studies on major markers were performed.

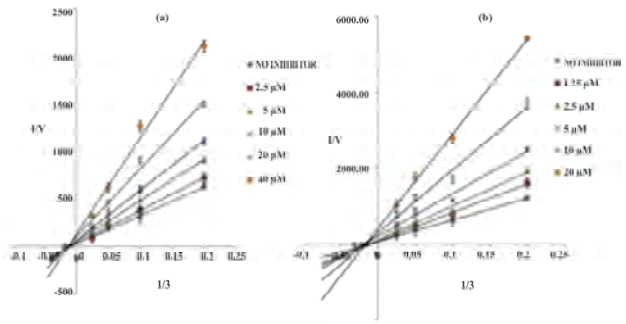
1.6 CDR-267F018

Marker compounds in the pure form using HPLC have been isolated.

2 Pharmacokinetics and metabolism

2.1 Enantioselective inhibition of Cytochrome P450-mediated drug metabolism by a novel antithrombotic agent, S-002-333: Major effect on CYP2B6

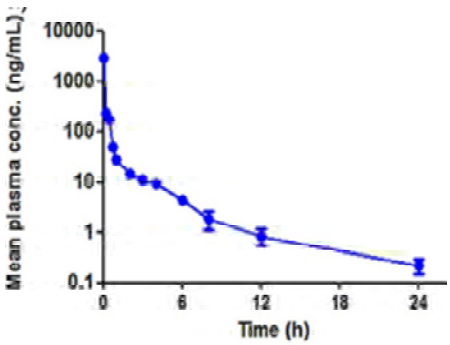
A significant number of new chemical entities (NCEs) fail in drug discovery due to inhibition of Cytochrome P450 (CYP) enzymes. Therefore, to avert costly drug failure at the clinical phase it becomes indispensable to evaluate the CYP inhibition profile of NCEs early in drug discovery. In light of these concerns, investigated the inhibitory effects of S-002-333, a novel and potent antithrombotic agent, on nine major CYP enzymes (CYP1A2, 2A6, 2B6, 2C8, 2C9, 2C19, 2D6, 2E1 and 3A4) of human liver microsomes (HLM). S-002-333 exists as racemic mixture of S-004-1032 (R-isomer) and S-007-1558 (S-isomer), consequently, further examined the enantioselective differences of S-002-333 in the inhibition of human CYP enzymes. Of the CYP enzymes tested, CYP2B6-catalyzed bupropion 6-hydroxylation was inhibited by S-002-333 (IC_{50} approximately 9.25 ± 2.46 muM) in a stereoselective manner with (S)-isomer showing potent inhibition (IC_{50} approximately 5.28 ± 1.25 muM) in contrast to (R)-isomer which showed negligible inhibition on CYP2B6 activity (IC_{50}> 50 muM). S-002-333



and its (S)-isomer inhibited CYP2B6 activity in a non-competitive fashion with estimated Ki values of 10.1 ± 3.4 muM and 5.09 ± 1.05 muM, respectively. No shift in the IC_{50} value was observed for S-002-333 and its isomers when preincubated for 30 min in the presence of NADPH suggesting that neither S-002-333 nor its enantiomers are time-dependent inhibitors. Thus, the present findings signified that S-002-333 is a potent stereoselective inhibitor of CYP2B6, whereas, inhibition for other CYPs was substantially negligible. These *in vitro* findings would be useful in deciding the development of S-002-333 as a single-enantiomer or as a racemic mixture. (**ChemBiol Interact 2016;256:257-265**).

2.2 Analysis of bacopaside I in biomatrices using liquid chromatography-tandem mass spectrometry: Pharmacokinetics and brain distribution in Swiss-albino mice

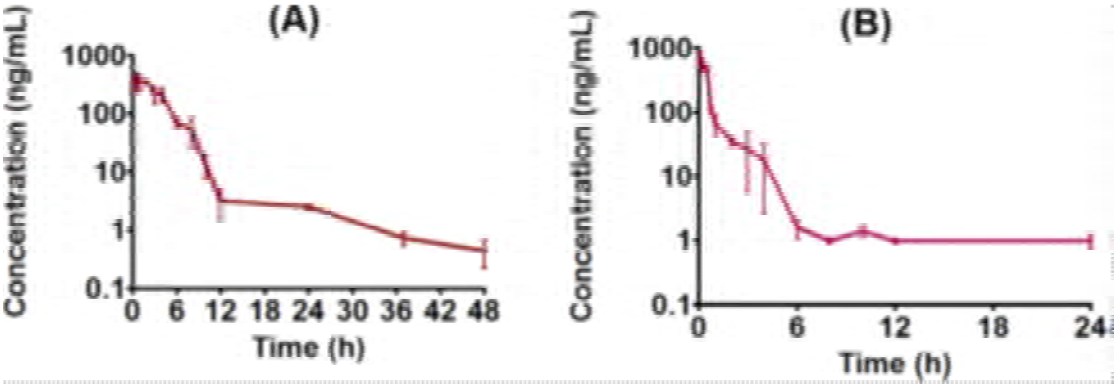
Bacopaside I (BP-I) is the major pseudojujubogenin glycoside of *Bacopa monniera* (BM) extract which has been widely used as a nerve tonic to improve the memory and intellect of human beings from ancient times. A selective and sensitive liquid chromatography-tandem mass spectrometry (LC-MS/MS) method for the quantification of BP-I in mouse plasma and brain homogenate has been developed and validated. All biosamples were processed by liquid-liquid extraction and chromatographed on C18- reversed phase column using mobile phase consisting of ammonium acetate (10mM, pH 4) - acetonitrile (10:90, v/v) at a flow rate of 0.5mL/min. The detection was performed in negative electrospray ionization mode and the precursor/product



ion transitions of BP-I and internal standard (IS) hydrochlorothiazide were quantified in multiple reaction monitoring (MRM) using QTRAP-5500 MS/MS. The linearity was established over the concentration range of 0.5-2000ng/mL (r^2>0.990), with lower limit of quantification (LLOQ) of 0.5ng/mL in both plasma and brain matrix. Within- and between-run precision and accuracy were well within the acceptable limits of variation. Consistent and reproducible recovery (>70%) was obtained with insignificant matrix effect for BP-I and IS. The method fulfilled US Food and Drug Administration (USFDA) guidelines for bioanalytical method validation in terms of selectivity, sensitivity, linearity, accuracy, precision, matrix effect, dilution integrity, carry-over effect and stability. Further, the method was successfully applied to execute the plasma pharmacokinetics and brain distribution of BP-I in Swiss-albino mice following intravenous administration at a dose of 5mg/kg. (**J Pharm Biomed Anal 2016;125:101-109**.)

2.3 Pre-clinical investigation of plasma pharmacokinetics and biodistribution of a novel antithrombotic agent S-002-333 in mice using LC-MS/MS.

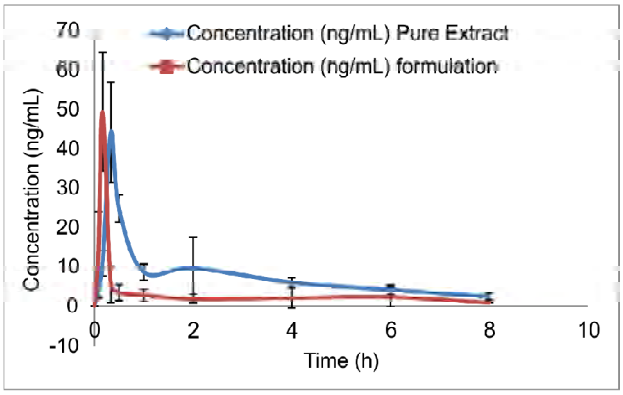
S-002-333 [2-(4-methoxy-benzenesulfonyl)-2,3,4,9-tetrahydro-1H-b-carboxylic acid amide] is a novel and



potent antithrombotic agent developed by CSIR-CDRI, India. The present study was aimed to develop a sensitive LC-MS/MS method for the quantification of S-002-333 in mice plasma and tissues. The extraction of S-002-333 from relatively small amount of mouse biomatrices (50muL) was accomplished using protein precipitation followed by liquid-liquid extraction and the separation of analytes was achieved on C18 reversed phase column using acetonitrile and triple distilled water (75:25, v/v) as mobile phase at a flow rate of 0.6mL/min. The instrument was operated in the multiple reaction monitoring (MRM) mode using electrospray ionization (ESI) in the positive scan mode. For all the biomatrices, linear relationship was attained over the concentration range of 0.39-200ng/mL with correlation coefficients e"0.992. The lower limit of quantification for mouse plasma and tissue homogenates was 0.39ng/mL. The bioanalytical method was reproducible and reliable for all the matrices with inter-day and intra-day variability in precision being less than 15% and accuracy within ±15%. The assay was successfully applied to pharmacokinetics and tissue distribution of S-002-333 in mice. The pharmacokinetic study revealed adequate gastrointestinal absorption of S-002-333 into the systemic circulation of mice with absolute oral bioavailability of 45.8%. Tissue distribution data showed rapid and wide distribution of S-002-333 in the following order: small intestine>liver>kidney approximately lungs>heart>spleen>brain. The present findings may provide meaningful basis for further clinical development of this new chemical entity. (**J Chromatogr B AnalytTechnol Biomed Life Sci 2016;1031:154-162**.)

2.4 Pharmacokinetic studies of Ashwagandha [NMITLI-118R(T+)] Formulation

Optimized formulation was dispersed in TDW and pure extract was dispersed in 0.25% CMC and the suspension was administered orally at the dose of 4000mg/kg body weight to each rat. Three rats per each time point where group at 0.083, 0.167, 0.333, 0.5, 1.0, 2.0, 4.0, 6.0 and 8.0h post dosing. The blood samples were collected after light ether anesthesia from the retro-orbital plexus of rats using heparin sodium as anticoagulant. All the samples were stored at -20°C. Withanolide A was measured in the samples using LC-MS/MS. Oral PK studies of NIMPLC were undertaken and compared with NMITLI118RT+. All subjects showed early absorption of withanolide A. Its peak plasma levels



(44.13±12.72 ng/mL) were observed at 0.33 h in NMITLI118RT+while it peaked (72.395±2.55 ng/mL) at 0.167 h in case of NIMPLC elucidating higher C_{max} and a lower T_{max} value in the prepared formulation. $T_{1/2}$ was found to be 2.16±0.12 and 4.80±0.14 h for NMITLI118RT+and NIMPLC, respectively. This indicates rapid absorption and slow elimination of marker compound from NIMPLC. Overall systemic availability of withanolide A was found to be 70.45±16.26 h*ng/mL in NMITLI118RT+and 123.52±5.98 h*ng/mL in NIMPLC. It could be deduced that the enhanced bioavailability of withanolide A in NIMPLC resulted from its improved aqueous solubility and release.

2.5 PK studies of antithrombotic lead candidate S-002-333 and isomers S-004-1032 & S-007-1558

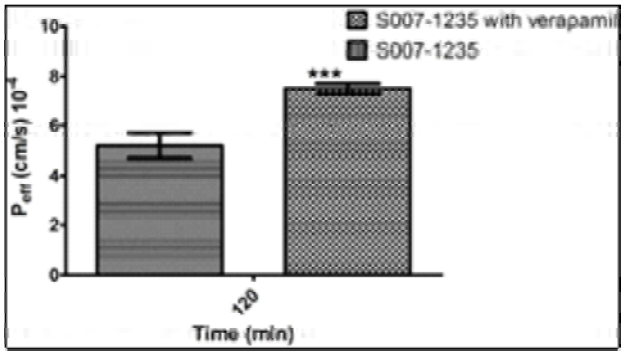
The aim of this research work was to characterize the metabolism of S-002-333, (2-(4'-methoxy-benzenesulfonyl)-2,3,4,9-tetrahydro-1H-pyrido (3,4-b) indole-3-carboxylic acid amide) and its enantiomers, S-004-1032 (R-form) and S-007-1558 (S-form) in pooled human liver microsomes (PHLM) and pooled liver microsomes (LM) of rat (RLM), rabbit (RABLM), dog (DLM) and monkey (MLM). Another objective of this study was to identify suitable surrogate species to humans for further development of lead candidates. *In vitro* metabolic stability

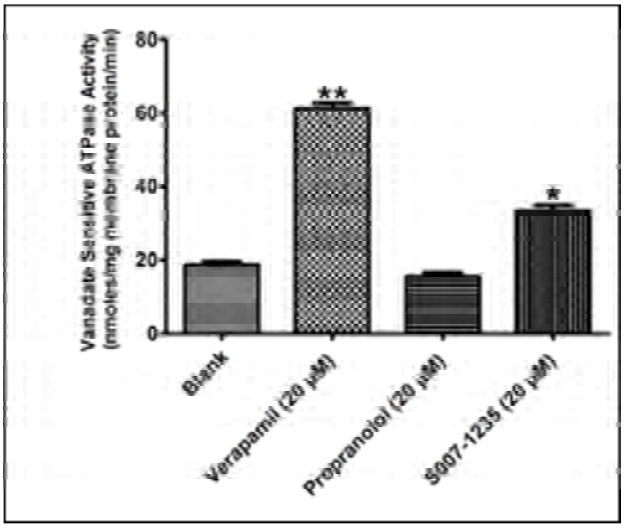
Species	Antithrombotic lead canddidates	Predicted $CL_{H(pred)}$ (ml/min/kg)		
		Well-stirred model	Parallel-tube model	Dispersion model
Human	S002-333	0.95 ± 0.17	0.97 ± 0.17	0.99 ± 0.17
	S004-1032	1.84 ± 0.25	1.92 ± 0.28	1.92 ± 0.27
	S007-1558	1.97 ± 0.24	2.07 ± 0.27	2.06 ± 0.26
Rabbit	S002-333	4.38 ± 0.10	4.49 ± 0.09	4.54 ± 0.08
	S004-1032	5.54 ± 1.49	5.77 ± 1.61	5.78 ± 1.57
Rat	S002-333	16.98 ± 2.01	18.92 ± 2.49	18.38 ± 2.33
	S004-1032	15.29 ± 0.58	16.83 ± 0.69	16.42 ± 0.66
	S007-1558	39.86 ± 0.85	50.37 ± 1.24	46.91 ± 1.11

and metabolite identification of S-002-333 and enantiomers were carried out in PHLM and LM of various species. The prediction of surrogate species and *in vitro in vivo* extrapolation were performed based upon the calculated *in vitro* intrinsic clearance (CL_{int}). The *in vitro* CL_{int} values for S-002-333, S-004-1032 and S-007-1558 were 0.027±0.005, 0.025±0.004 and 0.036±0.005ml/min/mg, respectively, in PHLM, indicating that S-007-1558 was the most metabolically unstable of the three. The LM of other species showed similar results. A common surrogate species to humans for S-002-333 and enantiomers was predicted as rabbit where the extrapolated hepatic clearance (CL_H) did not show a significant difference to the *in vivo* CL_H values. However, none of the species closely mimic humans with respect to the proportion of major metabolites (M-1–M-4) formed in vitro. Likewise, the CL_H values were also predicted in humans for S-002-333 and enantiomers using various mathematical models. During analysis, there was no chiral inversion evident among the individual isomers throughout in vitro and *in vivo* experiments. In conclusion, the *in vitro* results indicate a prominent role of phase I metabolism in the degradation of S-002-333 and enantiomers and predict rabbit as an alternative species to conduct further safety and efficacy studies.

2.6 Pharmacokinetics of anti-leukemic compound S-007-1235

Solubility of S-007-1235 was higher in buffers of different pH in comparison to water and S-007-1235 was found to be partially soluble in all the tested media. The permeability values (P_{eff}) of S-007-1235 in the ileum (5.2 ± 0.2 × 10^{-4}) indicated that the compound is highly





permeable. However, P_{eff} of S-007-1235 was significantly higher ($p < 0.001$) in presence of verapamil and indicated that S-007-1235 is a substrate of P-gp efflux transporters present in enterocytes. The P_{eff} and K_a values were translated to human, which were found to be 16.95 ×10^{-4} cm/sec, 1.01 min^{-1}, respectively, indicating high ileal permeability in humans. Also, S-007-1235 (20 μM) increased the ATPase activity of human P-gp membrane indicating that it is a substrate of human P-gp.

The *in vitro* and *in vivo* studies showed five putative metabolites. Identification of metabolites of S-007-1235was carried out in *in vitro* (rat, mice and human liver microsomes) and *in vivo* (serum and liver samples of BALB/c mice treated with a single 10 mg/kg intravenous single dose). On comparing the chromatograms of the extracts from incubation of S-007-1235 with HLM, RLM and MLM (both in presence and absence of NADPH), three NADPH dependent metabolite (M1, M2 and M3) were identified in HLM, RLM and MLM. Additionally, metabolite M4 was also identified in RLM. Likewise, 5 metabolites (M1, M2, M3, M4, M5) were identified in serum and liver homogenates samples from Balb/c mice and *Sprague Dawely* rat intravenously administered with S-007-1235. Structural elucidation of detected metabolite was based on fragmentation patterns of parent ion from MS/MS mode. The structure of metabolites M1, M2 and M3 was further

confirmed from the chromatograms of their reference standards synthesized in-house.

2.7 Pharmacokinetics of an anti-TB compound S-012-0241

LC-MS/MS method for quantitative estimation of S-012-0241 has been developed and validated in rat serum with LLOQ of 1 ng/mL, linearity between 1 and 200 ng/mL and recovery of >80%. This was applied for the following *in vitro* and *in vivo* studies. It was found to be stable in SIF but was unstable in SGF. Its plasma protein binding was found to be moderate (53.4 ± 6.7%). The metabolic stability of S-012-0241 using rat liver microsomes showed that the compound is rapidly metabolized (*in vitro* half-life, 12.5 ± 0.5 min) with intrinsic and hepatic clearance of 0.014 ± 0.001 mL/min mg and 134.9 ± 5.2 mL/min kg of protein, respectively. The *in vitro* metabolism study indicated a demethylated metabolite (M-1) of the compound. The pharmacokinetics of S-012-0241 was studied after single oral (10 mg/kg) and intravenous (2.5 mg/kg) administration in male *Sprague Dawley* rats. It was quickly absorbed, distributed and eliminated from the serum (elimination half-life, 1.6±0.1 h) post dose. It exhibited a large volume of distribution (19.1±0.1 L/kg) and high clearance (4.9±0.2 L/h/kg). The oral bioavailability was found to be 11.1±1.1%.

2.8 Pharmacokinetics of anti-BPH compound S-013-1632

LC-MS/MS method for quantitative estimation of S-013-1632 was developed and partially validated in rat serum with LLOQ of 5 ng/mL, linearity of 5-200 ng/mL and recovery of >75% and then applied for its pharmacokinetic study in male *Sprague Dawley* rats. The oral and intravenous pharmacokinetics and tissue (prostate and hypothalamus) uptake of S-013-1632 were studied after single 10 mg/kg dose in male *Sprague Dawley* rats. It was quickly absorbed, distributed and slowly eliminated from the serum (elimination half-life of 5.4 h) post dose. The oral bioavailability was found to be 35.4%. Higher levels in prostate than that in serum and hypothalamus indicate that the compound naturally targets the target organ for main effects (prostate), hence might be a promising candidate drug for the management of BPH.

2.9 Bone uptake study of 99/373 in male and ovariectomized rats

LC-MS/MS method (LLOQ, 2 ng/mL; linearity, 2-200 ng/mL and recovery, >90%) for quantitative estimation of 99/373 was developed and then applied for its bone uptakestudy in male and ovarectimized female *Sprague Dawley* rats. Following 10 mg/kg oral dose, the levels of 99/373 was below LOD in bone marrow of both male and ovarectimized rats.

2.10 Pharmacokinetics of anti-osteoporotic phytopharmaceutical extract CDR-2492-C002)

LC-MS/MS method for quantitative estimation of the four biomarkers (2492/K007, 2492/K008, 2492/K009 and 2492/K010) of ethanolic extract of CDR-2492/C002 was developed. 2492/K007, K008, K009 and K010 were found to be present 0.20, 0.013, 0.0004 and 0.046%, respectively, in CDR-2492/C002.The LC-MS/MS method applies to 50 µL of serum and exhibited excellent linearity between 1 and 200 ng/mL. Recoveries of the markers was >70% for K007 and K008 but <5% for K009 and K010 with acceptable accuracy and precision.

Following oral dosing of CDR-2492-C002 (500 mg/kg) and its formulation (250 mg/kg) in male *Sprague Dawley* rats, all the four markers (K007, K008, K009 and K010) in serum samples were below LLOQ (1 ng/mL). Only 2492/K007 and K008 could be quantified following enzymatic hydrolysis of the serum samples. However, their pharmacokinetic profile could not be figured out due to irregular serum concentration-time profile post CDR-2492-C002 dose. Moreover, 2492/K007 and K008 could be quantified up to 8 h in the hydrolyzed serum samples of the rats treated with the formulation. They exhibited low systemic availability, large volume of distribution, high clearance and mean residence time of ~3.5 h.

3 Regulatory Toxicology

3.1 Systemic Toxicity Studies

3.1.1 S-0011-1793s Single dose toxicity study in Swiss Albino mice by oral route

The compound was tested at doses of 250, 500, 1000 mg/kg body wt. in Swiss Albino Mice. The MTD of compound was 500mg/kg wt.

3.1.2 S-0011-1793s Single dose toxicity study in SD Rat by oral route

The compound was tested at doses of 62.5, 125, 250, 500, mg/kg body wt. in SD rats. The MTD of compound was 500mg/kg wt.

3.1.3 S-002-333: 28 Days repeat dose toxicity study in CF Rats by oral route

The compound was tested doses 75, 150, and 600mg/kg body wt. In SD rats. The MTD of compound was 300mg/kg body wt.

3.1.4 S-010-1255: Single dose acute toxicity in Swiss mice by oral route.

Dose of 50mg/kg of compound S-010-1255 body weight tested in Swiss mice and found safe

3.1.5 GS/IICT/5/6-F1 Single dose acute toxicity study through intramuscular route

Dose of 200mg/kg and 400mg/kg of compound GS/IICT/5/6-F1 body weight tested in Swiss mice and found safe

3.1.6 GS/IICT/5/6-F2 Single dose acute toxicity study through intramuscular route

Dose of 200mg/kg and 400mg/kg of compound GS/ IICT/5/6-F2 body weight tested in Swiss mice and found safe

4 Safety Pharmacology

CDRI candidate molecules are subjected to safety pharmacological studies as mentioned below.

- Test System (species): Rats (for CVS, respiratory & oxygen saturation studies) and mice (for CNS studies)
- Study events:
- CVS-Blood pressure (BP) and heart rate (HR) measurements
- Respiratory- Frequency of respiration, tidal volume, inspiratory time, expiratory time, peak inspiratory time, peak expiratory time and enhance pause measurements
- Oxygen Saturation- Percentage O_2 saturation
- CNS- Gross Behavior activity, Motor activity, Rotarod test, Body temperature measurements and hot plate test
- human ether-á-go-go-related gene (hERG)- Binding to hERG ion channel

5 Clinical & Experimental Medicine

5.1 CDRI compound 97/78 (Anti-malarial agent)

The phase I clinical trials consisting of single dose study got approval from regulatory authorities. The single dose trial was completed and formulation is under preparation for multiple dose studies. Data of Plan & Protocol for Phase-I Multiple dose Clinical Trial and Clinical Pharmacokinetics has been compiled and submitted to DCGI and the case defended in the Drugs Controller General of India –Investigational New Drug Committee recently and the Permission to Undertake Phase-I Clinical trial is expected shortly.

5.2 Compound 99/373 (Anti-osteoporotic agent)

The rat model of osteoporosis showed excellent activity for compound 99/373. The preclinical studies were completed. Data of Plan & Protocol for Phase-I Single dose & Multiple dose Clinical Trial and Clinical Pharmacokinetics has been compiled and submitted to DCGI and the case defended in the Drugs Controller General of India –Investigational New Drug Committee recently and the Permission to Undertake Phase-I Clinical trial is expected shortly.

5.4 Herbal Medicament (Anti-stroke agent)

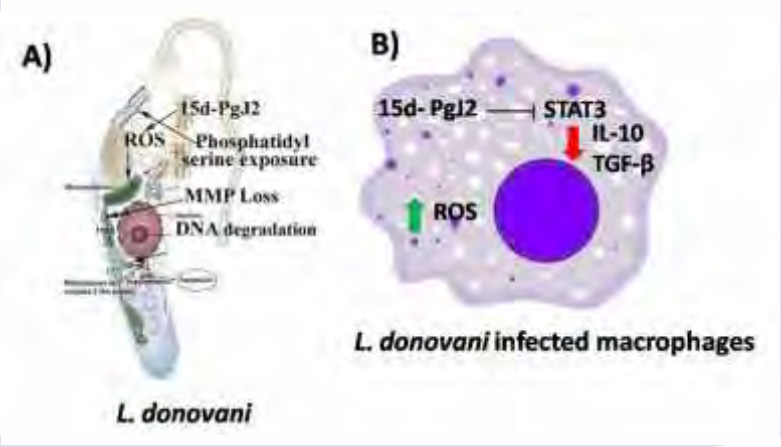
The draft IND was prepared. The discussions are ongoing with Themis pharmaceutical for further development and new indication of molecule.

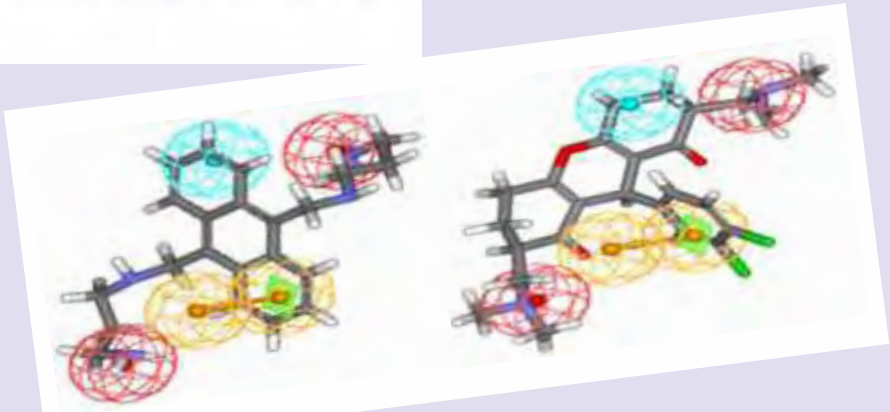
5.5 NMITLI118R (T+)

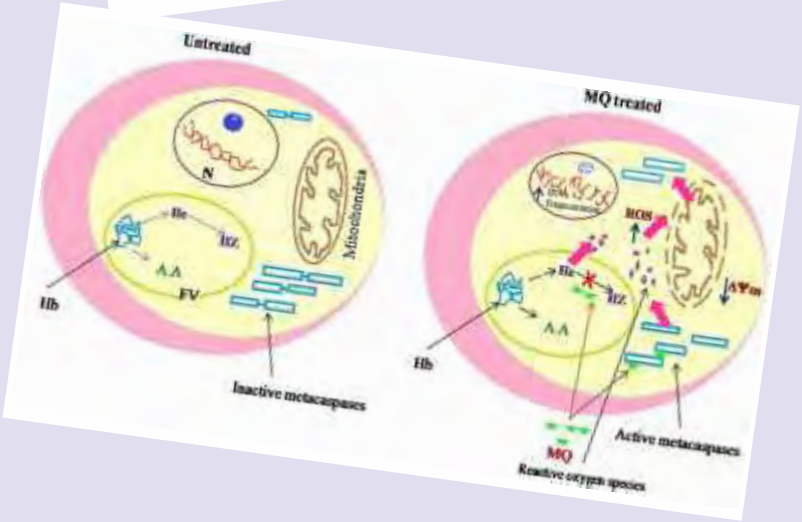
The preclinical data is under compilation for IND application like document preparation. The IND document will be completed for IND filing after monkey toxicity testing.

75 Years of
CSIR Touching Lives

Progress in Advancing the Knowledge Frontiers







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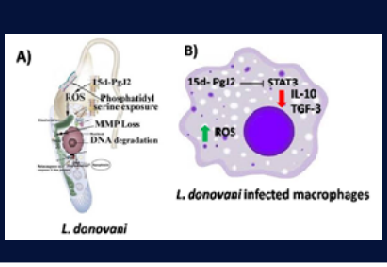

MALARIA AND OTHER PARASITIC DISEASES

Area Coordinators: Dr Saman Habib & Dr Neena Goyal

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Parasitic infections cause tremendous burden of disease in the tropics and subtropics as well as in more temperate climates. Malaria, Leishmaniasis and Filariasis are the three main parasitic disease areas being vigorously pursued at the institute both in relation to identifying potential drug intervention strategies as well as understanding disease biology. The basic research component of the program focuses on identification and characterization of novel drug targets, understanding mechanisms of drug action and drug resistance, investigation of parasite biochemical pathways and host-parasite interaction, immunoprophylaxis and immuno-diagnosis. The contribution of host genetic factors in malaria susceptibility in Indian populations is also pursued. The structural biology component of the program aids in molecular modeling and X-ray structure determination of key proteins and complexes.

1.1 Malaria

1.2 Leishmaniasis

1.3 Filariasis

Highlights of advancing the knowledge frontier

Translation in organelles of the malaria parsite

Killing of malaria parasites by antibiotics was reported many years ago; their target sites were initially thought to be confined to the *Plasmodium* mitochondrion until the discovery of the relict plastid (apicoplast). Early investigations in CDRI established that the apicoplast was translationally active and subsequent work (funded by the EU and CSIR Network project) led to identification of nuclear-encoded organelle-targeted factors that play critical roles in mediating translation initiation, elongation, and peptide release (Haider et al. *Mol. Microbiol*. 2015; Vaishya et al. *Mol. Microbiol*., 2016). Structure-function analysis and antibiotic-interaction effects revealed differences between the mitochondrial and apicoplast machineries, established deviation from well-characterized prokaryotic translation factors, demonstrated the reduced nature of *Plasmodium* organellar ribosomes (Gupta et al. *Open Biol*., 2014) and showed how release factors are parsimoniously deployed for stop-codon recognition in *P. falciparum* organelles. Together with investigations on tRNA synthetases led by other laboratories, this work on the partitioning and function of mitochondrial and apicoplast translation factors and ribosome subunits provides the base for future investigations on drug action against organellar protein translation (reviewed by Habib et al., *Trends Parasitol*., 2016)

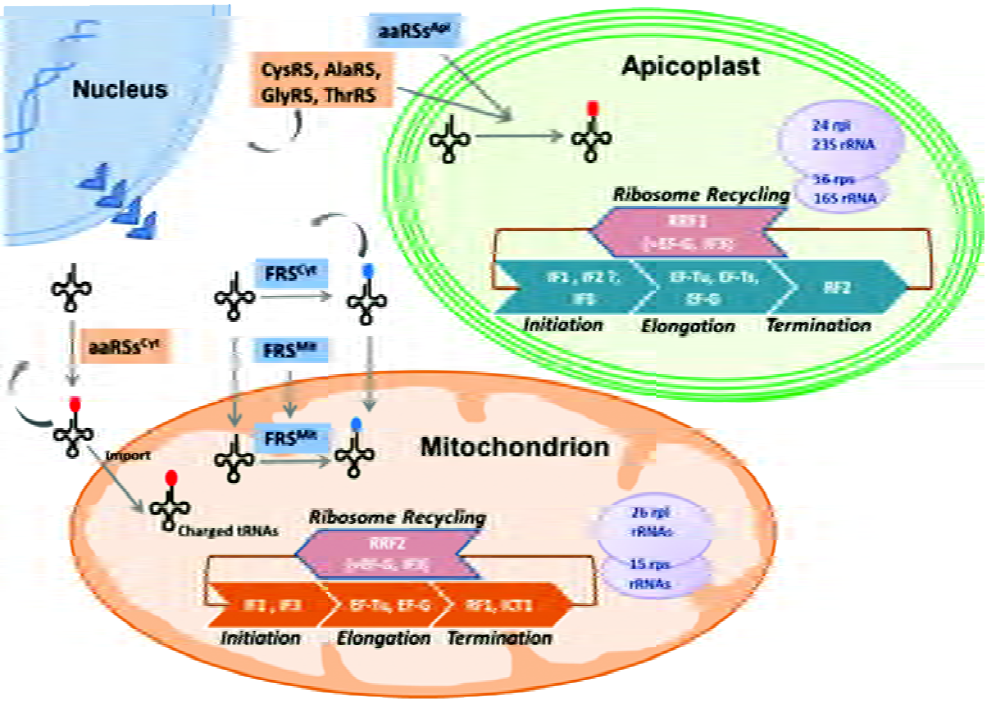


Figure: Partitioning of the protein translation machinery in organelles of *Plasmodium falciparum.*

1.1 Malaria

1.1.1 Factors mediating stop-codon recognition during protein translation in organelles of *Plasmodium falciparum*

In addition to cytosol, the apicoplast and mitochondria of the malaria parasite are also sites of active protein synthesis [Habib et al. (2016)*Trends in Parasitology*32: 940-952]. Herein, extended earlier studies on identification, targeting and functional characterization of translation initiation and elongation factors and attempted to unfold the mechanism of stop-codon recognition during peptide chain termination in these organelles. Release factors (RFs) responsible for recognition of the UAA and UGA stop- codons of apicoplast

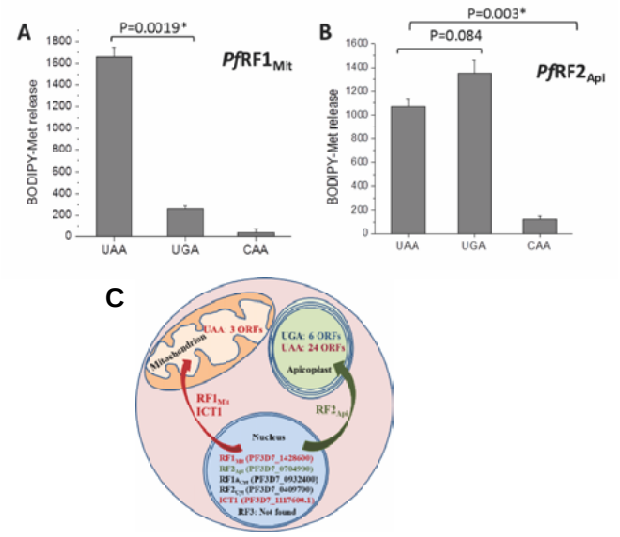


Fig. 1. *Pf*RF1$_{Mit}$(**A**) and *Pf*RF2$_{Api}$ (**B**) exhibit stop-codon specific peptidyl t-RNA hydrolase activity measured by BODIPY-Met release from BODIPY-Met-tRNA^{fMet}in ribosomal complexes containing mRNA with sense or stop-codons. (**C**) Partitioning of nuclear-encoded release factors to the apicoplast and mitochondrion. Red and green indicate proteins targeted to the mitochondrion and apicoplast, respectively

ORFs and the sole UAA stop-codon that terminates translation from the three mitochondrial ORFswere identified. A single nuclear-encoded canonical RF2, *Pf*RF2$_{Api}$, localizing to the apicoplast has a conserved tripeptide motif (SPF) for stop-codon recognition and is sufficient for peptidyl-tRNA hydrolysis (PTH) from both UAA and UGA. Two RF family proteins are targeted to the parasite mitochondrion; a canonical RF1, *Pf*RF1$_{Mit}$, with a variant codon-recognition motif (PxN instead of the conserved RF1 PxT) is the major peptidyl-hydrolase with specific recognition of the UAA codon relevant to mitochondrial ORFs. Mutation of the N residue of the *Pf*RF1$_{Mit}$PxN motif and two other conserved residues of the codon recognition domain lowers PTH activity from pre-termination ribosomes indicating their role in codon-recognition. The non-canonical *Pf*ICT1 is the second RF imported by the mitochondrion; it functions as a dimer and mediates codon non-specific peptide release. These results have helped delineate a critical step in organellar translation in *Plasmodium*, which is an important target for anti-malarials(***Molecular Microbiology***100:1076-1095).

1.1.2 Transfer of [Fe-4] cluster onto target apoprotein in the apicoplast SUF pathway of cluster biogenesis

Assembly of [Fe-S] complexes is an important post-translational modification on proteins and plays a critical role as a catalytic centre in important enzymes. The SUF pathway of [Fe-S] biogenesis is localized to the apicoplast and experimental evidence for its function in the organelle was provided by us earlier. In an attempt to delineate the pathway following cluster assembly onto a SufB-C-D complex, characterized transfer of [4Fe-4S] from reconstituted recombinant PfSufA and PfNfu onto a model apoprotein. Results indicate that both PfSufA and PfNfu serve as carriers for [4Fe-4S] indicating redundancy in the last step of the pathway.

1.1.3 Genetic manipulation and functional drug targeting

Genetic manipulation and drug targeting approaches against *Plasmodium* sporozoite specific proteins are being addressed. The laboratory has generated several knockouts using the *Plasmodium berghei* model.*Plasmodium* aspartic proteases, plasmepsins play many critical roles in parasite life cycle. Most of the plasmepsins are well characterized.

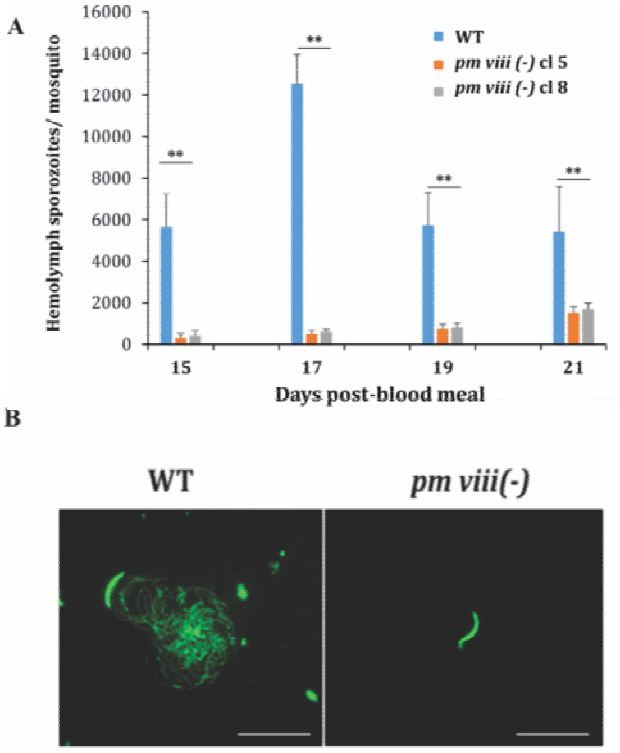


Fig. 2. *Plasmodium* Plasmepsin VIII is essential for sporozoite egress from oocyst and gliding motility. (A) Quantification of hemolymphsporozoites in mosquitoes infected with WT and *pbpm viii (-)* parasites. (B) Gliding motility was abolished in *pbpm viii (-)* hemolymphsporozoites. WT sporozoites display the typical continuous and circular gliding motility pattern while *pbpm viii (-)*sporozoites were non-motile. Scale bar=25µm.

However the role of plasmepsins VIII in *Plasmodium* remains unknown. We have elucidated the functions of plasmepsins VIII in the rodent malaria parasite *P. berghei*. By targeted gene deletion, we show that plasmepsins VIII is critical for sporozoite egress from oocyst and gliding motility (*International Journal for Parasitology, in press*). In another study, we have characterized the role of a novel and conserved *P.berghei* protein SPELD. *Pbspeld*ko was essential for *Plasmodium* liver stage maturation. mCherry transgenic of PbSPELD localized the protein to plasma membrane of sporozoites and early EEFs. Global microarray analysis of *Pbspeld*ko revealed EEF attenuation being associated with down-regulation of genes central to general transcription, cell cycle, proteasome and cadherin signaling. *pbspeld* mutant EEF's induced pre-erythrocytic immunity with 50% protective efficacy. Studies have implications for attenuating the human *Plasmodium* liver stages by targeting SPELD locus (accepted in ***Scientific Reports***).

1.1.4 Understanding the role of non-canonical nucleic acid structures in *P. falciparum*

Most of the research efforts in malaria are confined to identification of protein factors which regulate parasite biology. However, little attention has been given to non-canonical nucleic acid structures which may play critical roles in transcriptional/translational regulation of AT-rich *P. falciparum* genome. Genome-wide analysis revealed that parasite genome harbors G-quadruplexes in nuclear and organellar genes that participate in antigenic variation, pathogenesis, DNA/RNA regulation, metabolic and protein quality control processes. Analysis of steady state mRNA (RNA-seq) and polysome-associated mRNA (Ribosome profiling) data revealed stage-specific differences in translational efficiency of G-quadruplex harboring genes. Further experiments are underway to explore these non-canonical secondary structures as pharmacological targets for parasite inhibition. [***Genomics*** (2016) 108: 224]

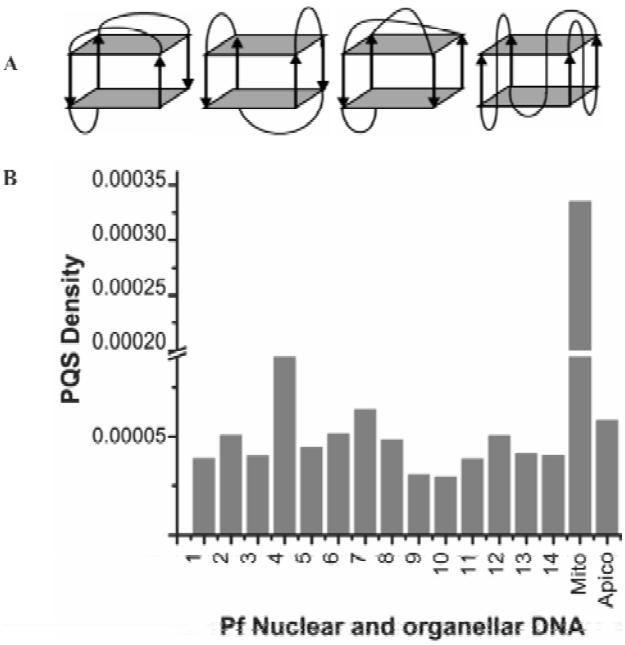


Fig.3. (A)Structural diversity of intramolecular quadruplexes showing different loop orientations. (B) Density of Potential quadruplex forming sequences (PQS) in nuclear and organellar (mitochondria and apicoplast) genome of *P. falciparum*.

1.1.5 Mefloquine induces ROS mediated programmed cell death in the malaria parasite

Recent studies pioneer the existence of a novel programmed cell death pathway in malaria parasite Plasmodium and suggest that it could be helpful in developing new targeted anti-malarial therapies. Considering this fact, evaluated the underlying action mechanism of this pathway in mefloquine (MQ)-treated parasite. Since cysteine proteases play a key role in apoptosis, performed preliminary computational simulations to determine binding affinity of MQ with metacaspase protein model. The binding pocket, identified using computational studies, was docked with MQ to identify its potential to bind with the predicted protein model. Herein, further determined apoptotic markers such as mitochondrial dysregulation, activation of cysteine proteases and in situ DNA fragmentation in MQ treated/ untreated parasites by cell-based assay. Results showed low mitochondrial membrane potential, enhanced activity of cysteine protease and increased number of fragmented DNA in treated parasites compared to untreated ones. Next tested the involvement of oxidative stress in MQ

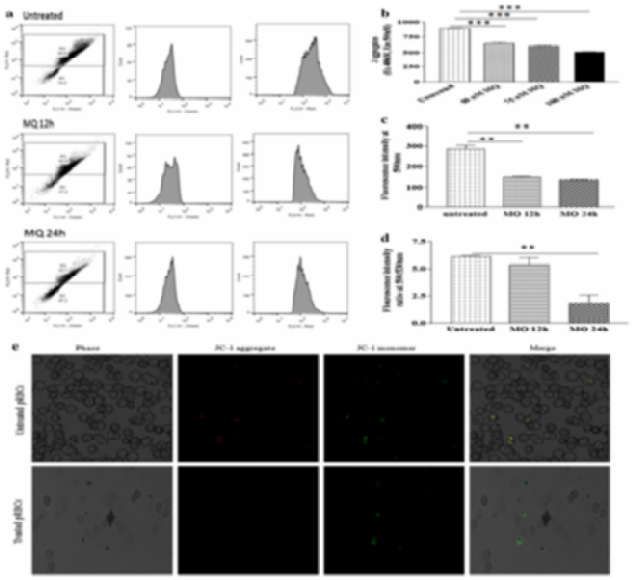


Fig. 4. Mitochondrial membrane potential ($\Delta\Psi m$) of *P. falciparum* after treatment with MQ as estimated by JC-1 staining. (a)Flow cytometry dot plot showing reduction in JC-1 red staining in the parasite population treated with MQ as compared to untreated parasites. Histogram showing shift of MQ treated parasite population towards green channel, (b) MQ treated parasite showing decrease in J-aggregates when compared with untreated group, c. Mean fluorescence intensity at 590 nm d. Graph showing ratio of JC-1 (red)/JC-1(green) parasite population. Data were pooled from two separate set of experiments and data expressed as mean values ± SEM, e. Microscopic pictures of JC-1 stained untreated pRBCs and MQ treated pRBCs. ***P d" 0.001.

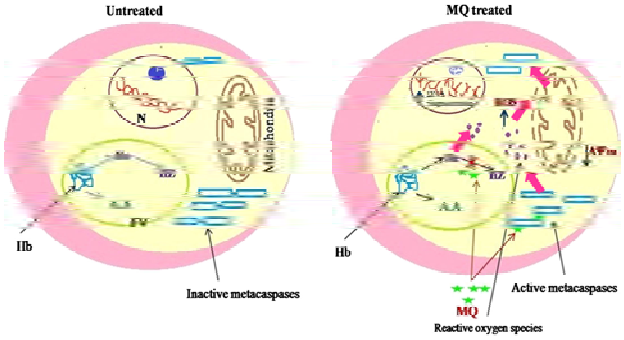


Fig. 5. Diagrammatic representation of proposed action mechanism of MQ induced cell death in plasmodium. MQ inhibits hemozoin formation from free heme and generate reactive oxygen species (ROS purple dots). ROS promote mitochondrial outer membrane permeabilization by depolarizing the mitochondrial membrane and further activates cystein proteases which cause DNA fragmentation and other proteins degradation. On other hand some extent of the MQ remains in cytoplasm, directly activates the metacaspase by interacting with it and leads the apoptotic pathway. Pink color arrows indicating the sequence of changes occur in MQ induced apoptotic cell death in malaria parasite; plasmodium.

mediated cell death and found significant increase in reactive oxygen species generation after 24 h of treatment. Therefore, it is concluded that apart from hemozoin inhibition, MQ is competent to induce apoptosis in *Plasmodium* by activating metacaspase and ROS production [**Apoptosis** (2016) 21, 955–966].

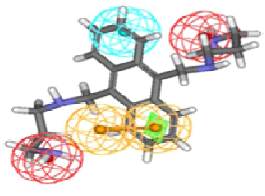
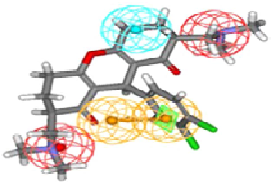
1.1.6 Combination therapy

Aiming to develop new artemisinin-based combination therapy (ACT) for malaria, antimalarial effect of a new series of pyrrolidine-acridine hybrid in combination with artemisinin derivatives was investigated. Synthesis, antimalarial and cytotoxic evaluation of a series of hybrid of 2-(3-(substitutedbenzyl)pyrrolidin-1-yl)alkanamines and acridine were performed and mode of action of the lead compound was investigated. *In vivo* pharmacodynamic properties (parasite clearance time, parasite reduction ratio, dose and regimen determination) against multidrug resistant (MDR) rodent malaria parasite and toxicological parameters (median lethal dose, liver function test, kidney function test) were also investigated. 6-Chloro-N-(4-(3-(3,4-dimethoxyb-enzyl)pyrrolidin-1-yl)butyl)-2-methoxyacridin-9-amine (15c) has shown a dose dependent haem bio-mineralization inhibition and was found to be the most effective and safe compound against MDR malaria parasite in Swiss mice model. It displayed best antimalarial potential with artemether (AM) *in vitro* as well as *in vivo*. The combination also showed favourablepharmacodynamic properties and therapeutic response in mice with established MDR malaria infection and all mice were cured at the determined doses. The combination did not show toxicity at the doses administered to the Swiss mice. Taken together, findings suggest that compound 15c is a potential partner with AM for the ACT[**Parasitology** (2016) 143, 1421–1432].

1.1.7 Identification of novel DNA minor groove binders

In recent years the DNA minor groove has attracted much attention for the development of antimalarial agents. In view of this, identification of novel DNA minor groove binders through *in-silico*and *in-vitro* workflow was attempted. A rigorously validated pharmacophore model comprising of two positive ionizable (PI), one hydrophobic (HY) and one ring aromatic (RA) features was used to mine NCI chemical compound database. This led to retrieval of many hits which were screened on the basis of estimated activity, fit value and Lipinski's violation. Finally, λ' two compounds NSC639017 and NSC371488 were evaluated for their *in-vitro* anti-malarial activities against *Plasmodium falciparum* 3D7 (CQ sensitive) and K1 (CQ resistant) strains by SYBR green-I based fluorescence assay.The results revealed that out of two, NSC639017 possess excellent anti-malarial activity particularly against chloroquine resistant strain and

Table 1: Anti-malarial efficacy of identified hits against *Plasmodium falciparum* and safety index against VERO cell line

Name of hits	IC_{50} (µg/ml)		CC_{50} (µg/ml) (VERO Cell line)	SI (CC_{50}/IC_{50})		Mapping of hits on pharmacophore
	*Pf*3D7 (CQ sensitive)	*Pf*K1 (CQ resistant)		*Pf*3D7	*Pf*K1	
NSC639017	1.15 ±0.2	0.38±0.02	126.04	109.6	331.68	
NSC371488	3.08 ±0.02	1.54 ±0.03	36.89	11.97	23.95	
Chloroquine	0.005	0.598	353.29	70600.00	590.78	

moreover NSC639017 also appeared to be safe (CC50126.04 µg/ml) and selective during cytotoxicity evaluation [**Scientific Reports**(2015) 5:13838].

1.2 Leishmaniasis

1.2.1. Mechanism of drug resistance

1.2.1.1. Identification and characterizationof possible targets of MAPK1 of *L. donovani*

Mitogen-activated protein kinases (MAPKs) are well-known mediators of signal transduction of eukaryotes, regulating important processes, like proliferation, differentiation, stress response, and apoptosis. In *Leishmania*, MAPK1 has been shown to be consistently downregulated in antimony-resistant field isolates, suggesting that it has a role in antimony resistance. It negatively regulates the expression of P-glycoprotein-type efflux pumps in the parasite. The decrease in efflux pump activity with an increase in Ld-MAPK1 expression may

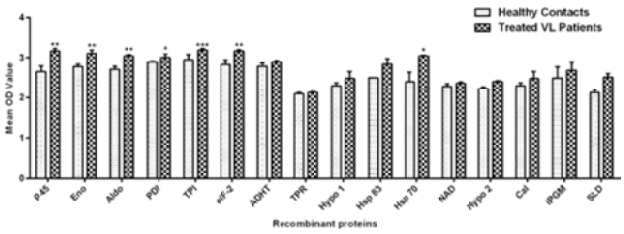


Fig. 6. Lymphoproliferative response in PBMCs of treated VL patients in response to15 recombinant proteins and SLD (10µg/mleach). Each bar represents the pooled data (mean±SE). Significance values indicate the difference in stimulation between the SLD and there combinant proteins ("p<0.05,""p<0.01, and"""p<0.001).

result in increased antimony accumulation in the parasite, making it more vulnerable to the drug (Antimicrobial Agents and Chemotherapy 2015, 59, 3853-3863). With an aim to identify the possible targets(s) of MAPK1, conducted pull out studies using anti-LdMAPK1 polyclonal antibodies. The trapped proteins were analyzed by 10% SDS-PAGE and western blotting. LdMAPK1 was found to interact with the major and minor subunits of the HSP90 foldosome complex. The study may thus demonstrate a novel role for the MAP kinase1 of *L. donovani* in the regulation and possible post-translational modification of heat shock proteins.

1.2.2 Immunobiology

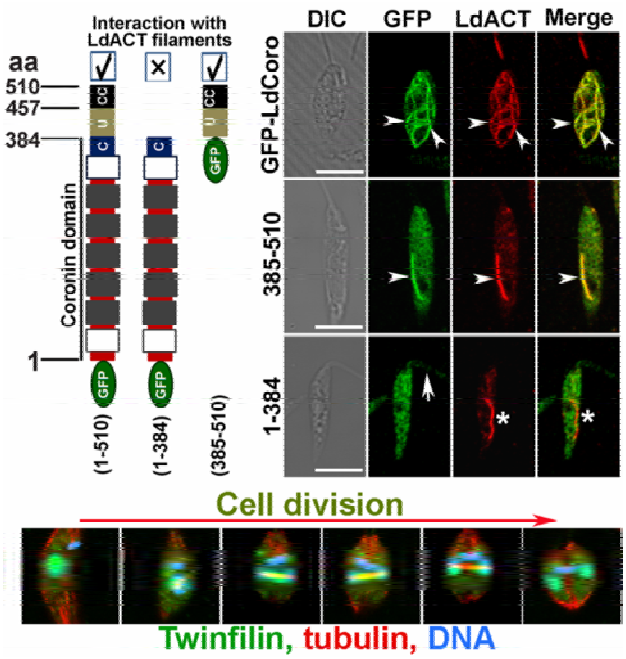
Recombinant Th1 Stimulatory Proteins of *Leishmania donovani*: Comparative Analysis of Cellular Immune Responses in Treated Leishmania Patients and Hamsters

Prior studies demonstrated that out of eighteen Th1 stimulatory proteins identified through proteomic analysis of sub-fraction (ranging from 89.9 to 97.1 kDa), 15 were developed as recombinant proteins. Recently, evaluated these 15 recombinant proteins simultaneously for their comparative cellular responses in treated Leishmania patients and hamsters. Six proteins viz. elongation factor-2, enolase, aldolase, triose phosphate isomerase, protein disulfideisomerase, and p45 emerged as most immunogenic and may be exploited for developing a successful poly-protein and/or poly-epitope vaccine against VL. [***Frontiers in Microbiology***, 2016. 22:312]

1.2.3 Drug target identification and characterization

1.2.3.1. Functions of actin-network proteins in Leishmania:

An actin-dynamics regulating protein, coronin, has been characterized *in vitro* to identify its domains-interaction with actin filaments in Leishmania. Unlike other coronins, LdCoro forms tetrameric structure through its C-termainal coiled-coil domain and interacts with actin filaments through its unique linker domain to promote actin filament formation [**Cytoskeleton** (Hoboken), 2015, 72:621-632]. Another actin-binding protein, Twinfilin, was found to be localized into the Leishmania nucleolus and knockout study suggests that it regulates spindle-dynamics during cell division.



1.2.3.2. Structural and functional studies on proteins from Leishmania

Gamma glutamylcysteinesynthetase (Gcs) is an essential protein of trypanothione biosynthesis pathway synthesis which catalyses ATP-dependent ligation of L-Cysteine to L-Glutamate to form γ-glutamylcysteine. L-buthionine-S, R-sulfoximine (BSO), a specific inhibitor of Gcs, cures and prolongs survival of mice infected with *T. brucei* implicating Gcs as a potential drug target. However BSO induces toxicity leading to effect survival of hosts infected with *T. brucei* emphasizing the need to develop more potent inhibitors of Gcs. Work in the group on the functional characterization of *L. donovani* Gcs has led to the identification of novel inhibitors. Experimental validation of these inhibitors suggest that they are better

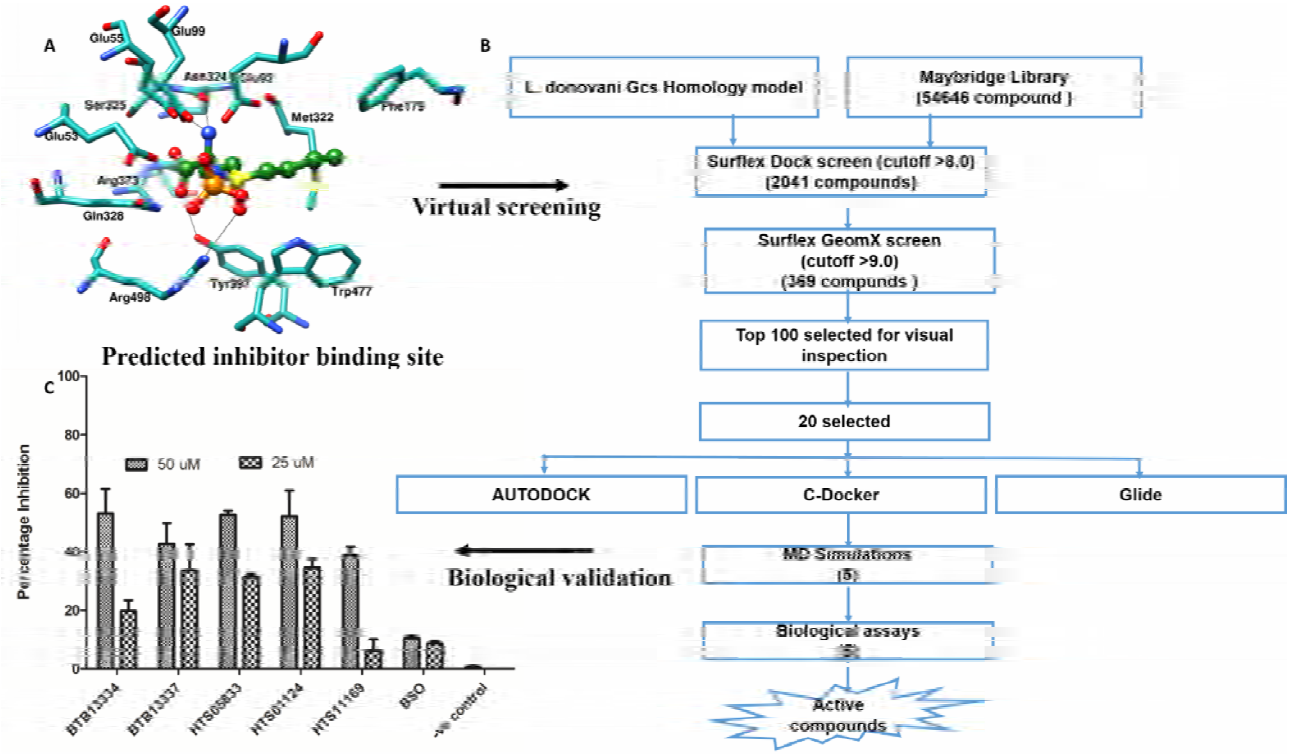


Fig.7. Discovery of novel inhibitor of LdGcs. A. The predicted active site obtained through computational and biochemical studies. B. The virtual screening workflow for obtaining potential inhibitors. C. The biological activity of inhibitors showing significantly higher inhibition than BSO

than BSO. The identified inhibitors are expected to provide starting templates for further optimization [**BB Rep** 8, 127-138].

Coiled coils are self-assembly conferring structural motifs that are present usually as a part of larger proteins or independently, and are pivotal to a variety of biological processes. The formation of a coiled coil is structurally simple and involves suitably spaced hydrophobic residues that are mutually buried in a knobs into holes manner. Coronins are multi-functional proteins possessing distinct cytoskeleton dependent and independent functions, and are classified into four distinct classes. *L. donovani* coronin possesses an N-terminal WD40 domain connected to a C-terminal coiled-coil domain by a long linker region. The coiled-coil domains of coronins are primarily responsible for self-association, although alternative roles have been proposed. Sequence analysis of *L. donovani* Coiled coil domain identify significant differences with other known homologues, that indicate altered structural association. The structure, solved by Se-SAD, shows that the structure is indeed distinctly different, with an altered topology and oligomerization. Instead of the parallel trimer observed in the homolog, *L. donovani* coronin coiled-coil domain assembles as an anti-parallel tetramer. The tetramer is

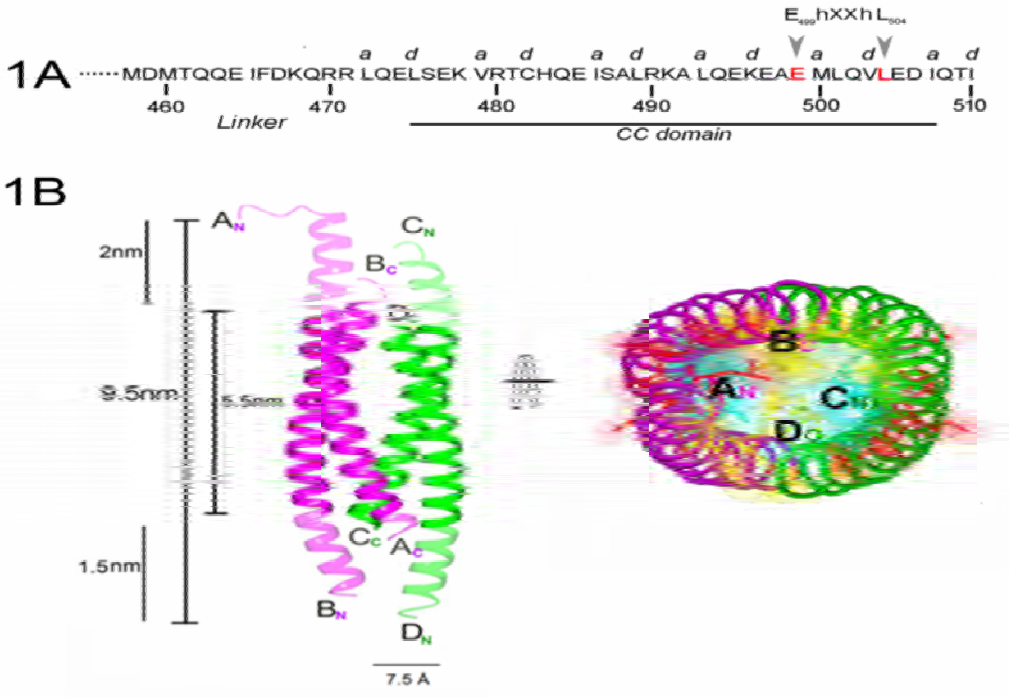


Fig. 8. *L. donovani*coronin

consistent with solution studies, as well as with the full length protein. The structure also shows an asymmetry, with one of the four helices, axially translated by ~ 2 turns. As the structure is a homo-oligomer, this asymmetry could have a role in the protein's function. Structural analysis has shown that the asymmetry is inherent to the structure, as the symmetric structure is occluded by steric interactions. Structure determination of the identified mutants are in progress [**J. Str. Biol**. 195 (1), 129-138]

Nucleoside diphosphate kinases (NDKs) are ubiquitous enzymes that catalyze the transfer of the γ-phosphate moiety from an NTP donor to an NDP acceptor and are crucial for maintaining the cellular level of nucleoside triphosphates (NTPs). The inability of trypanosomatids to synthesize purines *de novo* and their dependence on the salvage pathway makes NDK an attractive target to develop drugs for the diseases they cause. We have functionally characterized and elucidated the structure of *L. amazonensis* NDK. Using computational studies, novel inhibitors have been identified. Experimental inhibition studies showed that five of the compounds to be active *in vitro* a, with one of these compounds showing promise *in vivo.* Analysis of inhibitor-NDK complexes reveal their modes of binding, facilitating design of new compounds for optimization of activities as drugs against leishmaniasis.

1.2.3.3 Functional characterization of HSP60 (Chaperonins) of *L. donovani:* Development of knockout mutant of LdTCPg

Chaperonins are a class of molecular chaperons that encapsulate nascent or stress-denatured proteins and assist their intracellular assembly and folding in an ATP-dependent manner. In Leishmania, only the TCP1**g** subunit has been cloned and characterized. It exhibited differential expression at various growth stages of promastigotes. LdTCP1**g** formed high-molecular-weight complexes within *E. coli* cells as well as in Leishmania cell lysates. The recombinant protein is arranged into two back-to-back rings of seven subunits each and refolds luciferase in ATP dependent manner. LdTCP1**g** interacts with actin and tubulin proteins, suggesting that the complex may have a role in maintaining the structural dynamics of the cytoskeleton of parasites [FEBSJ, 2015]. To validate that LdTCP1g is a possible drug target, efforts were made to develop single and double knock out mutants by homologous gene replacement.

1.2.4 Mode of action of new potential antileishmanial candidates:

1.2.4.1. Plant-derived naphthoquinone metabolite induces mitochondria mediated apoptosis-like cell death in *Leishmania donovani*

Plumbagin, a plant-derived naphthoquinone metabolite (5-hydroxy-2-methyl-1,4-naphthoquinone) has been reported to inhibit trypanothione reductase, the principal enzyme and a validated drug target involved in detoxification of oxidative stress in *Leishmania*. We have studied the mechanistic aspects of cell death induced by plumbagin including physiological effects in promastigote form and ultrastructural alterations in both promastigote and amastigote (IC50, 0.25μM) forms of *Leishmania donovani* which till now remained largely unknown. Observations show that oxidative stress induced by plumbagin resulted in depolarization of the mitochondrial membrane, depletion in ATP levels, elevation of cytosolic calcium, induction of caspase 3/7-like protease activity and increased lipid peroxidation in promastigotes leading to an apoptosis-like cell death. The findings collectively highlight the mode of action and importance of oxidative stress inducing agents in effectively killing both forms of the *Leishmania* parasite and opens up the possibility of exploring plumbagin and its derivatives as promising candidates in the chemotherapy of Leishmaniasis. **[Apoptosis. 2016; 21(8):941-53].**

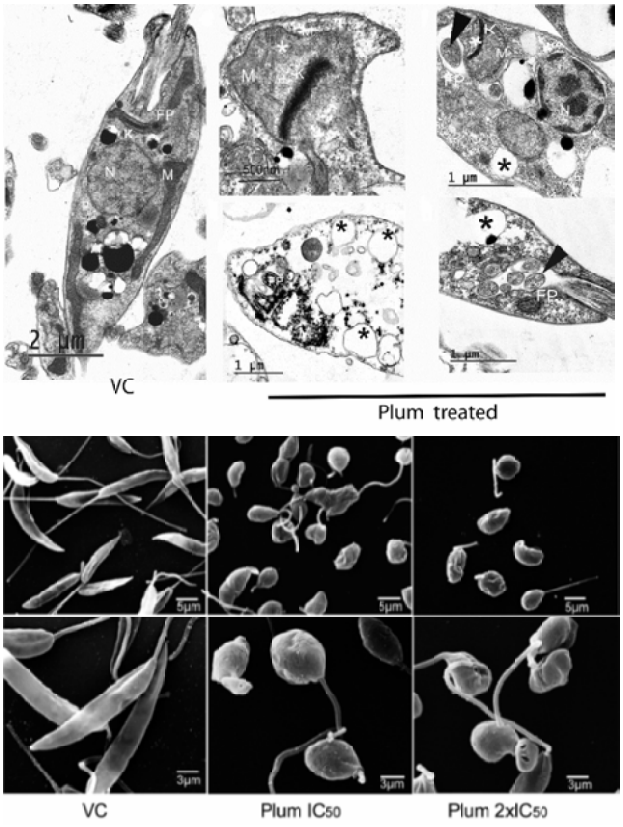


Fig. 9. Electron micrographs of *Leishmania donovani* promastigotes treated with plumbagin displaying features of apoptotic-like cell death.

1.2.4.2. 15d-Prostaglandin J2 induced reactive oxygen species-mediated apoptosis during experimental visceral leishmaniasis

In search of a new potential candidate for visceral leishmaniasis, evaluated the therapeutic efficacy of 15d-PgJ2 against *in vitro* and *in vivo* experimental model of visceral leishmaniasis as well as its possible mechanism of action.15d-PgJ2 effectively killed *L. donovani* promastigotes and amastigotes *in vitro* with IC_{50} of 104.6 and 80.09 nM, respectively. It was observed that at 2 mg/kg (mice) and 4 mg/kg (hamster) doses, 15d-PgJ2

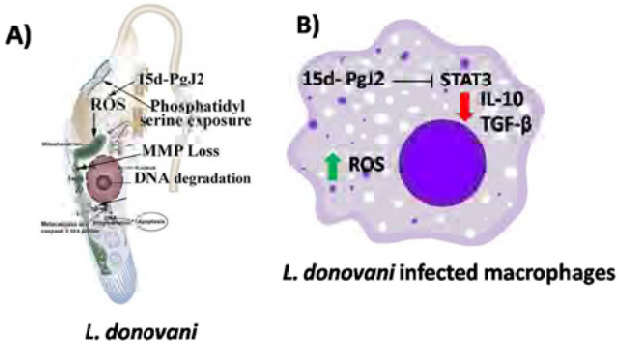


Fig. 10.(A) 15d-PgJ2 induces ROS generation, loss in mitochondrial membrane potential and activation of caspase-3-mediated programmed cell death in *L. donovani* promastigotes. (B)In host macrophages,15d-PgJ2 down regulated Th2 cytokine, IL-10 and elevated level of ROS which leads to killing of intracellular amastigotes.

decreased >90 % spleen and liver parasite burden. 15d-PgJ2 induced reactive oxygen species (ROS)-dependent apoptosis of promastigotes by triggering phosphatidyl serine externalization, mitochondrial membrane damage and inducing caspase-like activity. Moreover, when combined with sub-curative doses of Miltefosine and Amphotericin-B, 15d-PgJ2 resulted in >95 % parasite removal **[*J MolMed* (2016);94(6):695-710].**

1.2.5. Development of potential combination for the treatment of experimental visceral Leishmaniasis.

Leishmaniasis chemotherapy remains very challenging due to high cost of the drug and its associated toxicity and drug resistance which develops over a period of time. Now-a-days combination therapies (CT) are in use for many diseases like cancer and malaria being more effective and affordable than monotherapy. CT is believed to represent a new explorable strategy for leishmaniasis, a neglected tropical disease caused by obligate intracellular parasite *Leishmania*. In the present work, adopted a rational approach, to investigate the effect of combination of traditional Indian medicine (Ayurveda), a natural product curcumin and miltefosine, the only oral drug for visceral leishmaniasis (VL) using *Leishmania (Leishmania) donovani*/hamster model. Study was focused to develop an oral nanoparticle-based formulation of curcumin (CNP). Nanoformulation of curcumin alone exhibited significant leishmanicidal activity both *in vitro* and *in vivo*. In combination with miltefosine, it exhibited synergistic effect on both promastigotes and amastigotes under *in vitro* condition. The combination of these two also exhibited increased *in vivo* leishmanicidal activity which was accompanied with increased production of toxic reactive oxygen/nitrogen metabolites and enhanced phagocytosis activity. The combination also exhibited increased lymphocyte proliferation. The present study thus establishes the possible use of nanocurcumin as an adjunct to antileishmanial chemotherapy [**Antimicrob. Agents Chemother.** 2017, In press].

1.2.6. Recombinant *Leishmania* Rab6 (rLdRab6) is recognized by sera from visceral Leishmaniasis patients

Rab proteins form the largest branch of the Ras superfamily. Rab proteins are key regulators of intracellular vesicular transport and membrane trafficking. Although RabGTPases are well- recognized targets in human diseases but are under-explored therapeutically in the *Leishmania* parasite. Using a quantitative cytofluorimetric assay, analyzed the composition and organization of Rab6GTPase protein which was found to be primarily localized on the parasite subpellicular membrane and flagellum due to its association with kinesin motor proteins in the cytoskeletal microtubules. Aim was to also assess the diagnostic role of recombinant Rab6 protein from *Leishmania donovani* (rLdRab6) using sera/plasma of Indian visceral leishmaniasis (VL) patients. Receiver-operating characteristic (ROC) curve analysis indicated 100% sensitivity and 100% specificity for rLdRab6-based ELISA which was almost similar in comparison to recombinant K39-based ELISA (95.83% sensitivity and 100% specificity). Sera of patients from another intracellular

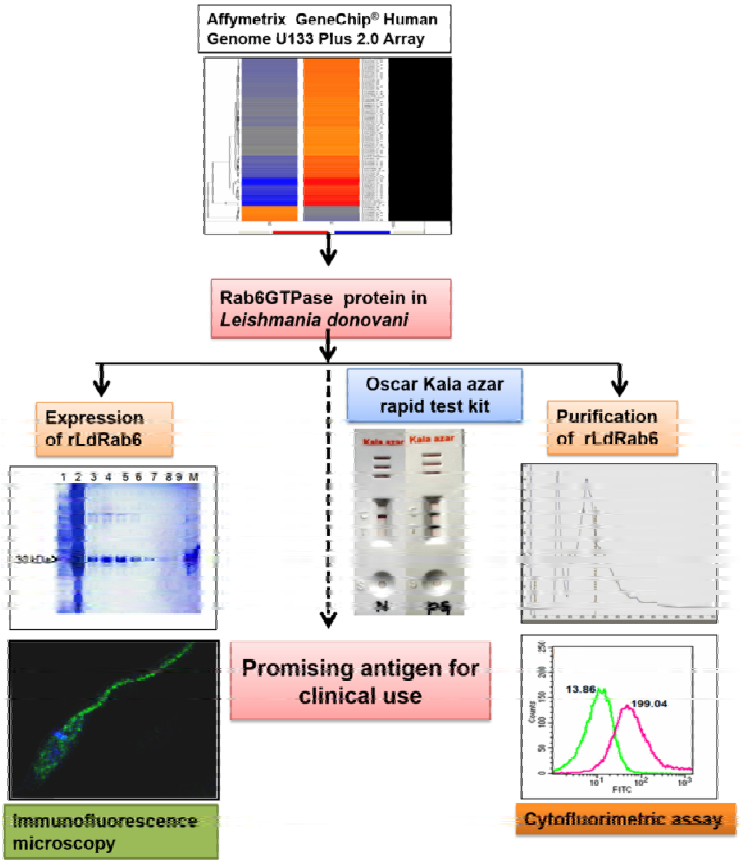


Fig. 11.

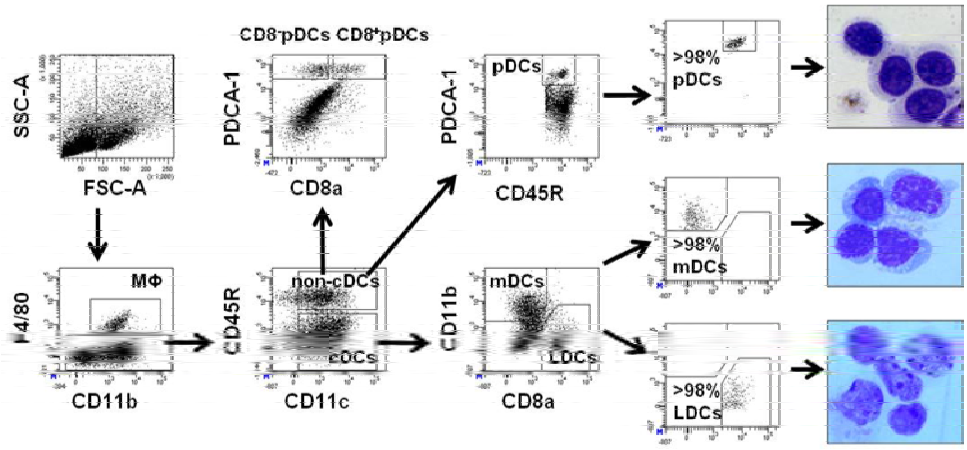


Fig.12. Identification and sorting of host DC subsets. Right panel shows Giemsa stained cytospin preparations from sorted cells (mDC=Myeloid DCs, LDCs=Lymphoid DCs, pDCs=Plasmacytoid DCs).

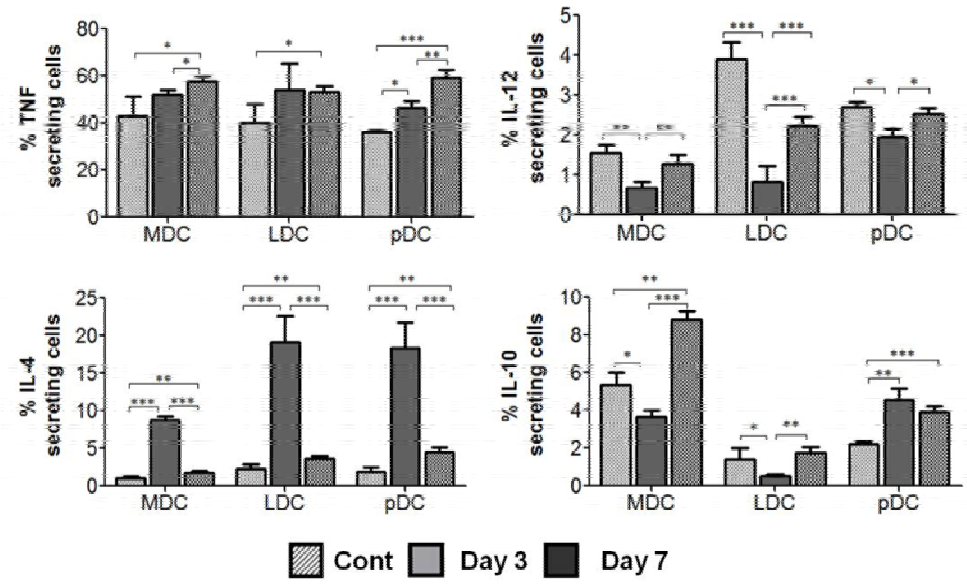


Fig. 13. Secretion of Th1 and Th2 cytokines by host DC subsets following infection with Bm-L3 (mDC=Myeloid DCs, LDCs=Lymphoid DCs, pDCs=Plasmacytoid DCs)

infected mice. Increased TNF-α, but reduced IL-12, TLR 4, 6 and 9 and reciprocal secretion of IL-4 and IL-10 were also observed across all DC subsets. Interestingly, Bm-L3 increased expression of CD80 and CD86 across all DC subsets, but decreased that of MHC-II on mDCs and pDCs resulting in their impaired antigen uptake and presentation capacity, but maximally attenuated the T-cell proliferation capacity of only mDCs. Furthermore, Bm-L3 increased p-p38, but not p-ERK in mDCs and LDCs but downregulated them in pDCs along with differential modulation of protein tyrosine phosphatases SHP-1, TCPTP, PTEN and PTP1B across all DC subsets. Taken together, It was found that early Bm-L3 infection causes differential functional impairment of host DC subsets and leads to an attenuated host T cell response **[Sharma et al., *Infection and Immunity, 2016*]**.

pathogenic infection, *Mycobacterium tuberculosis*, did not contain any significant levels of anti-rLdRab6 antibody.Thus,rLdRab6 accuracy in visceral leishmaniasis diagnosis makes it a promising antigen for clinical use.

1.3. Immunobiology of Lymphatic Filariasis

Role of Dendritic cell subsets during Filariasis

Filarial parasites cause functional impairment of host Dendritic cells (DCs) which are the major Antigen Presenting Cells (APCs) of the host immune system. However, effects of early infection on individual DC subsets are not known. Herein, investigated the effect of infective larvae of human filarial parasite *Brugia malayi* (Bm-L3) on FACS-sorted host DC subsets. It was found that Myeloid DCs (mDCs) accumulated early during infection (within day 3), while Lymphoid DCs (LDCs) and CD8⁺Plasmacytoid DCs (pDCs) peaked at day 7 p.i. in the spleens and mesenteric lymph nodes (mLNs) of

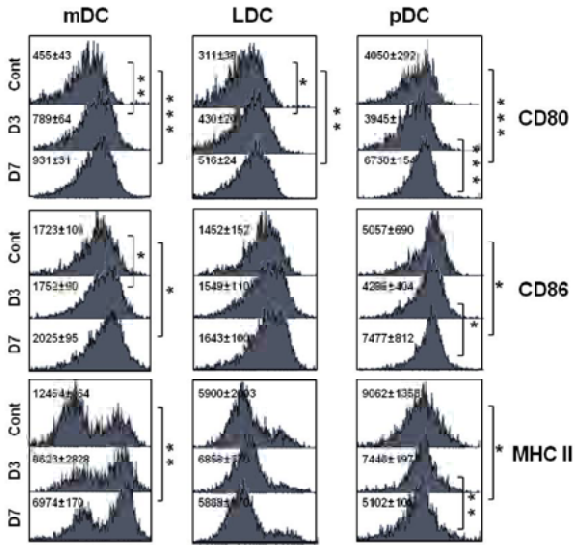


Fig. 14. Expression of co-stimulatory and maturation markers on host DC subsets following infection with Bm-L3. Numbers represent Median Flourescence Intensity (MFI) values of the respective marker at the indicated time points for each DC subset (mDC=Myeloid DCs, LDCs=Lymphoid DCs, pDCs=Plasmacytoid DCs).

REPRODUCTIVE AND BONE HEALTH RESEARCH

Area Coordinators: Dr Naibedya Chattopadhyay & Dr Anila Dwivedi

2

The overall objective of this project area is to generate new knowledge on male and female reproductive physiology relevant to fertility regulation, reproductive disorders and to impart new knowledge on metabolic bone disease particularly post-menopausal osteoporosis and associated fracture.
The research activities are focused at:

- Understanding the molecular signaling of endometrial receptivity for blastocyst implantation in addition to endometriosis, premature ovarian failure(POF) and polycystic ovary (PCOS) conditions.
- Identification and characterization of the oviductal factors playing role in sperm capacitation, fertilization, early embryonic development and understanding the basic mechanisms regulating maturation and oviductal transport of ova.
- Identification of new targets for contraception – Study of basic mechanisms governing spermatogenesis, sperm energetics, to understand the genetic and epigenetic causes of male infertility.
- The discovery of osteogenic proteins from bone marrow osteoprogenitors and osteogenic factors from plasma using animal models, proteomics and metabolomics approaches.
- Understanding the novel pathways that play critical role in osteoporosis, and to identify and characterize novel miRNAs involved in osteoblast differentiation.

2.1 Female Reproductive Biology

2.2 Male Reproductive System

2.3 Bone health Research

Highlights of advancing the knowledge frontier

Role of miRNAs Responsible for Bone Mass Reversal at the Time of Weaning

As part of the ASTHI program, that lays the emphasis in understanding the basics of bone biology, this study sought to understand embryonic skeletogenesis and post-natal bone development. Both these processes require the transfer of calcium from the mother to the offspring during pregnancy and lactation. It has been observed that bone resorption in the mother thus becomes elevated during these periods, resulting in significant maternal skeletal loss. There then follows an anabolic phase around weaning, during which there is a remarkable recovery of the maternal skeleton. We observed this in a time dependent manner, and assessed it quantitatively by micro-CT as shown below.

The mechanism(s) of this anabolic response remains largely unknown until date. The role of microRNAs (miRNAs) in regulating the skeleton is just beginning to emerge. Notably, the conditional deletion of the miRNA-processing endoribonuclease Dicer in cells of the osteoblast lineage demonstrates a clear requirement for miRNAs in embryonic skeletogenesis, as well as in post-natal bone growth,

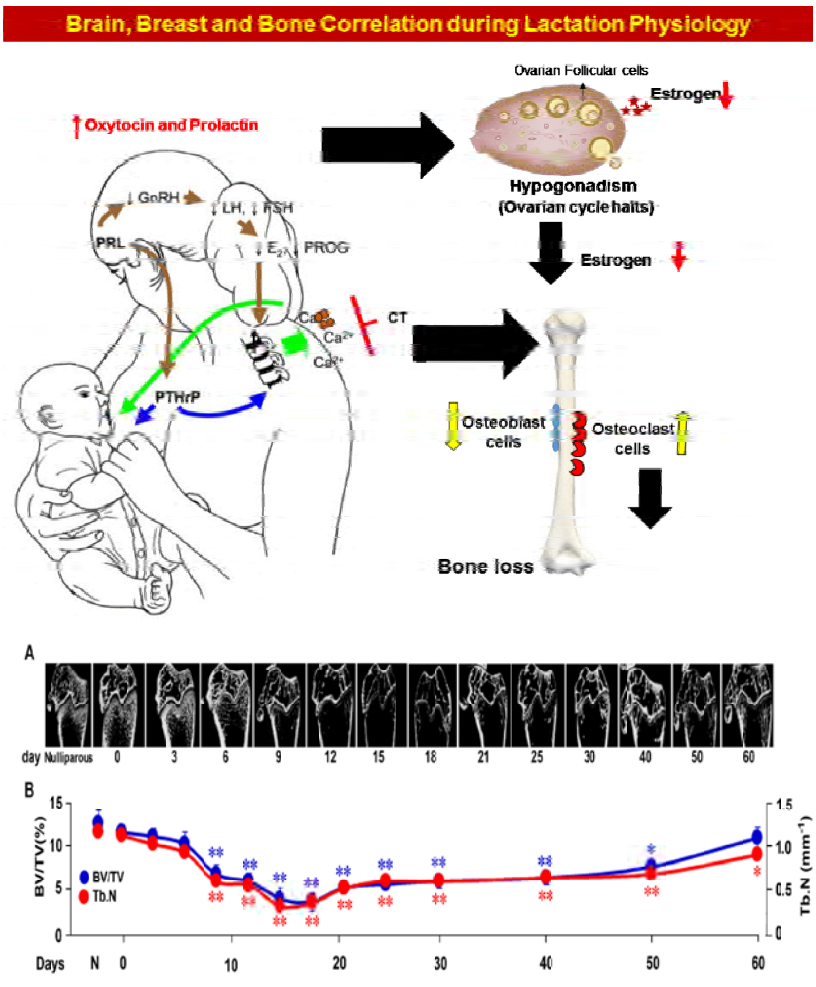


Figure 1: Bone loss and replenishment across the lactation-to-weaning transition in rats by micro-CT

modeling, and remodeling. miRNAs are small non-coding RNAs that mediate translational inhibition or degradation of a transcript by binding to complementary sites of the target mRNAs. This permits effective control of gene expression beyond genomic interactions between transcription factors and their cognate elements.

In this study, we aimed to identify miRNAs that were anabolic to the skeleton. We, thus examined miRNA expression during lactation and weaning, the two phases of reproduction characterized by marked fluctuations in bone resorption and formation. If these processes become decoupled, pregnancy- and lactation-associated osteoporosis ensue. There is evidence for an association between breast feeding and vertebral fractures, in essence, supporting the idea that lengthy lactation may, in fact, predispose to a greater risk of osteoporosis-related fractures in post-menopausal women. Testifying to the efficiency and uniqueness of this rapid remodeling phase, rats, which typically nurse multiple offsprings, can lose up to 35% of their bone mineral content over 21 days of lactation. This loss is completely reversed after weaning. ***For this reason, the weaning phase is considered the most anabolic phase in a rodent's reproductive cycle, and therefore provides a vital window for the identification of new anabolic targets.*** Here, we report the identification of eight miRNAs whose expression was specifically modulated during weaning.

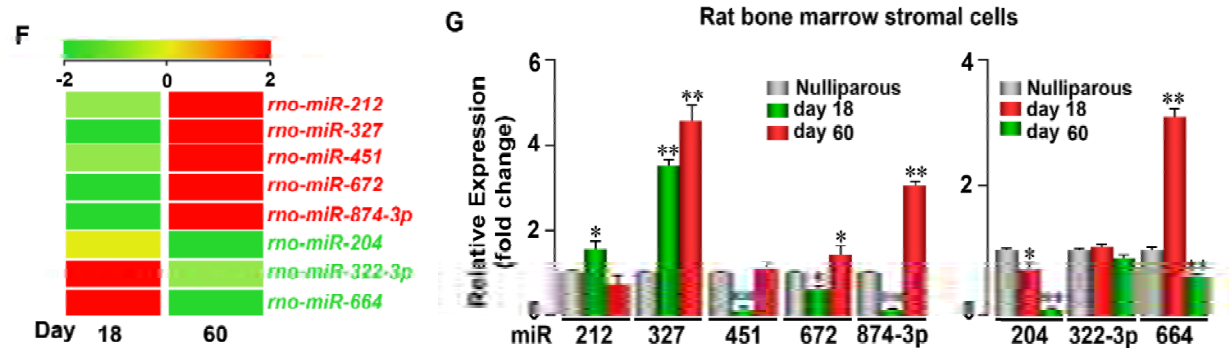


Figure 2: MiRNA profiling in the lactation and weaning phases

Figure 3: miR 874-p sequence marked in red

We chose to further explore the action of miR-874-3p on the osteoblast both *in vitro* and *in vivo*. We show that this weaning-associated miRNA is an anabolic target. Thus, an agomir of miR-874-3p induced osteoblast differentiation and mineralization. These actions were mediated through the inhibition of *Hdac1* expression and enhanced *Runx2* transcriptional activation

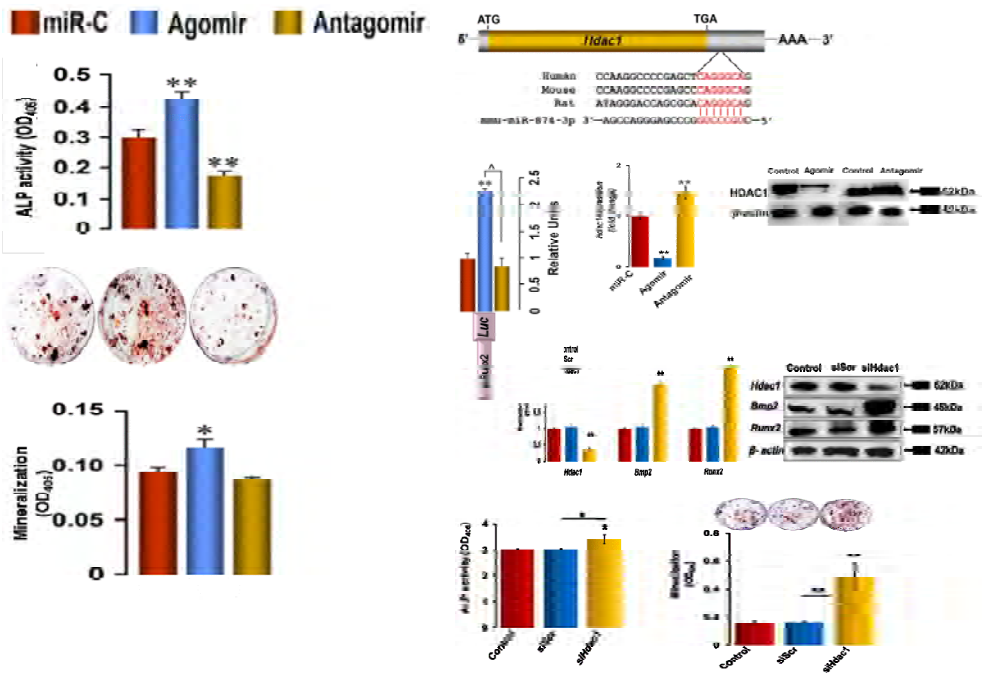


Figure 4: miR-874-3p suppresses Hdac1 to stimulate osteoblast differentiation.

When injected *in vivo*, the agomir significantly increased osteoblastogenesis and mineralization, reversed bone loss due to ovariectomy, and increased bone strength.

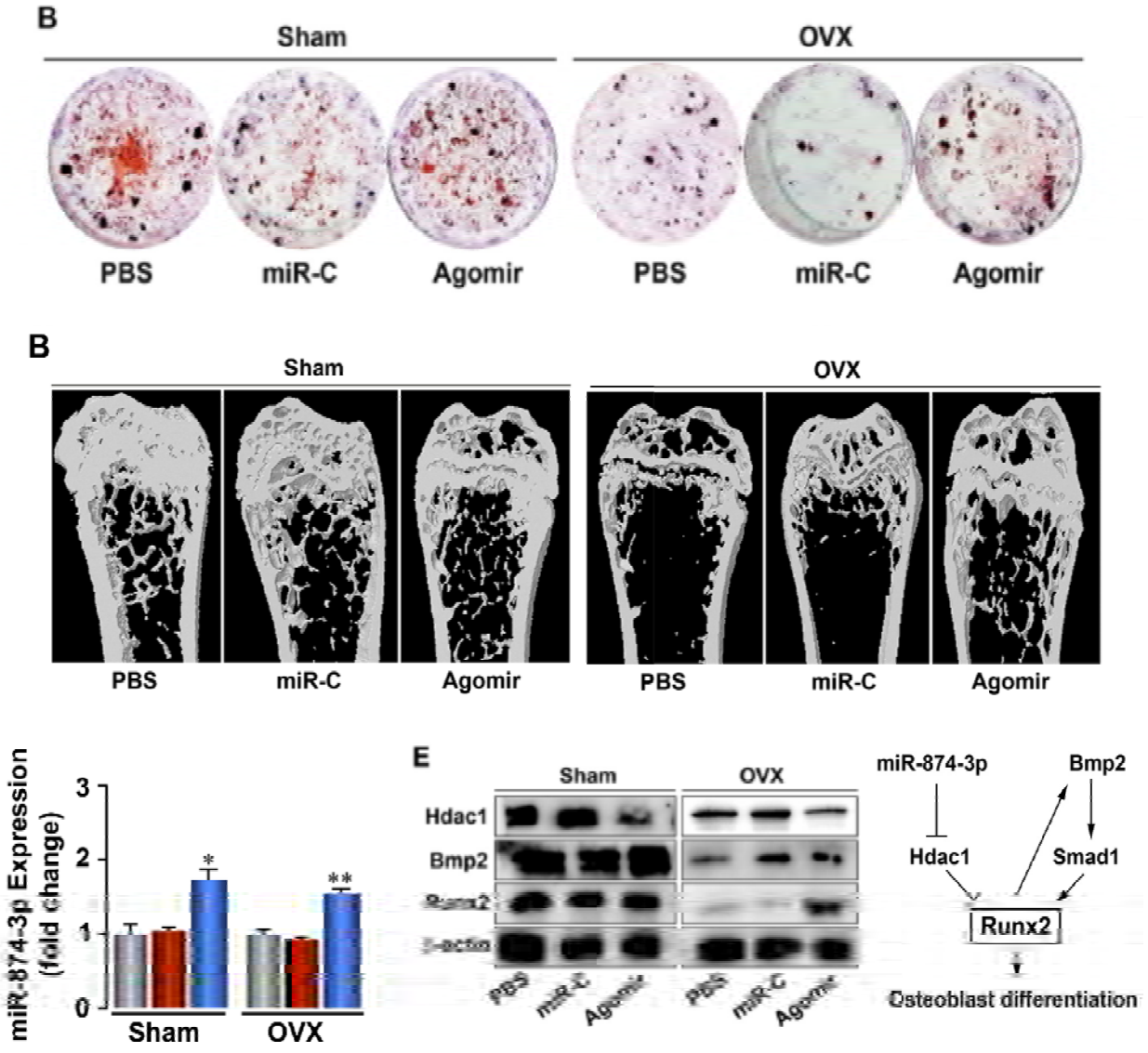


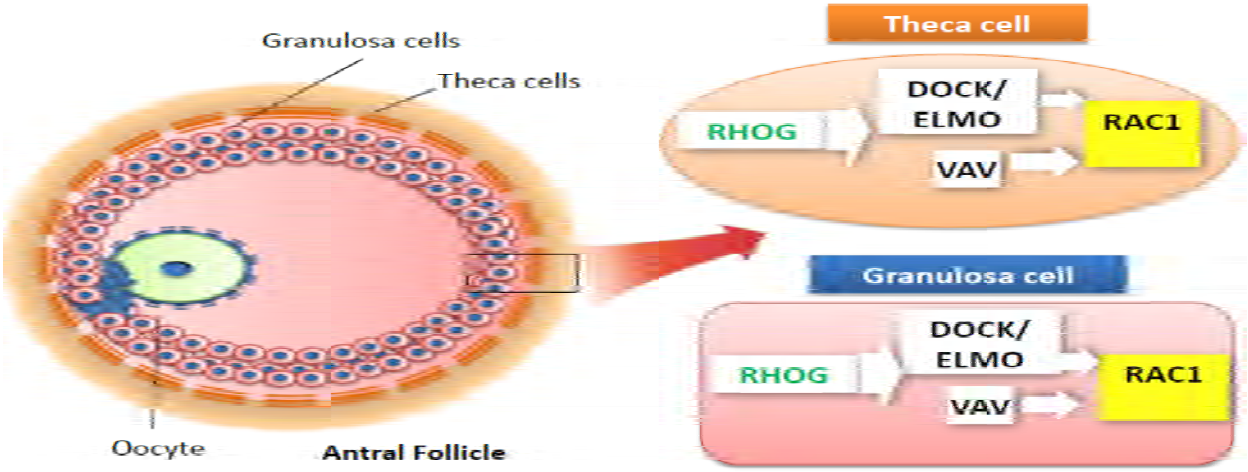
Figure 5: miR-874-3p reverses ovariectomy-induced bone loss and improves strength in mice

Considering that 4 to 6- fold elevates this miRNA during weaning, we speculate that elevated miR-874-3p expression during weaning enhances bone formation, and that ***this miRNA may become a potentially exciting therapeutic target for conditions of bone loss (J Biol chem 2016, 291:8, 3959-66)***

2.1 Female Reproductive System

2.1.1 RHOG-DOCK1-RAC1 signaling axis is perturbed in DHEA induced polycystic ovary in rat model

The function of RHOG, a RAC1 activator was explored in the ovary during ovarian follicular development and pathological conditions. Oocyte at secondary follicles along with stromal cells showed expression of RHOG optimally. RHOG revealed its maximum expression at diestrus and proestrus, which was downregulated at estrus stage. It was also seen in the theca and granulosa cells of the secondary and antral follicles. DHEA induced PCOS ovary exhibited weak staining of RHOG. RHOG associated downstream signaling molecules DOCK1 and ELMO1 were found reduced in the ovary in PCOS condition/ DHEA. RHOG can influence DOCK1 and RAC1 activity in the theca and granulosa cells from SD rat antral follicles. In conclusion, RHOG can mediate signaling through downstream effectors DOCK1 and RAC1 during ovarian follicle development (theca, granulosa and oocyte), but DHEA can down regulate them in the PCOS ovary (theca and granulosa cells) (***Reprod Sci. 2016 Sep 22, 2016).***



2.1.2 Development of *in vitro* ovarian follicle culture model: Effect of insulin supplementation on follicular growth and maturation

In the pursuit of investigation on the functional significance of miRNA in the process of ovarian folliculogenesis in mice, it has been established and optimized an *in vitro* follicle culture system. In the process, it has been determined the impact of insulin concentrations on *in vitro* pre-antral follicle growth, survival, antrum formation rate, and retrieval of mature oocytes in mice. It was recorded mice pre-antral follicle growth on days 2, 4, 6, 8, 10, and 12 of culture in α-modified essential media (α-MEM). The culture medium was supplemented with insulin concentrations of 6 µg/ml, 8µg/ml and 10 µg/ml along with 10% FBS, 100 mIU/ml follicle stimulating hormone (FSH), 10 mIU/ml luteinizing

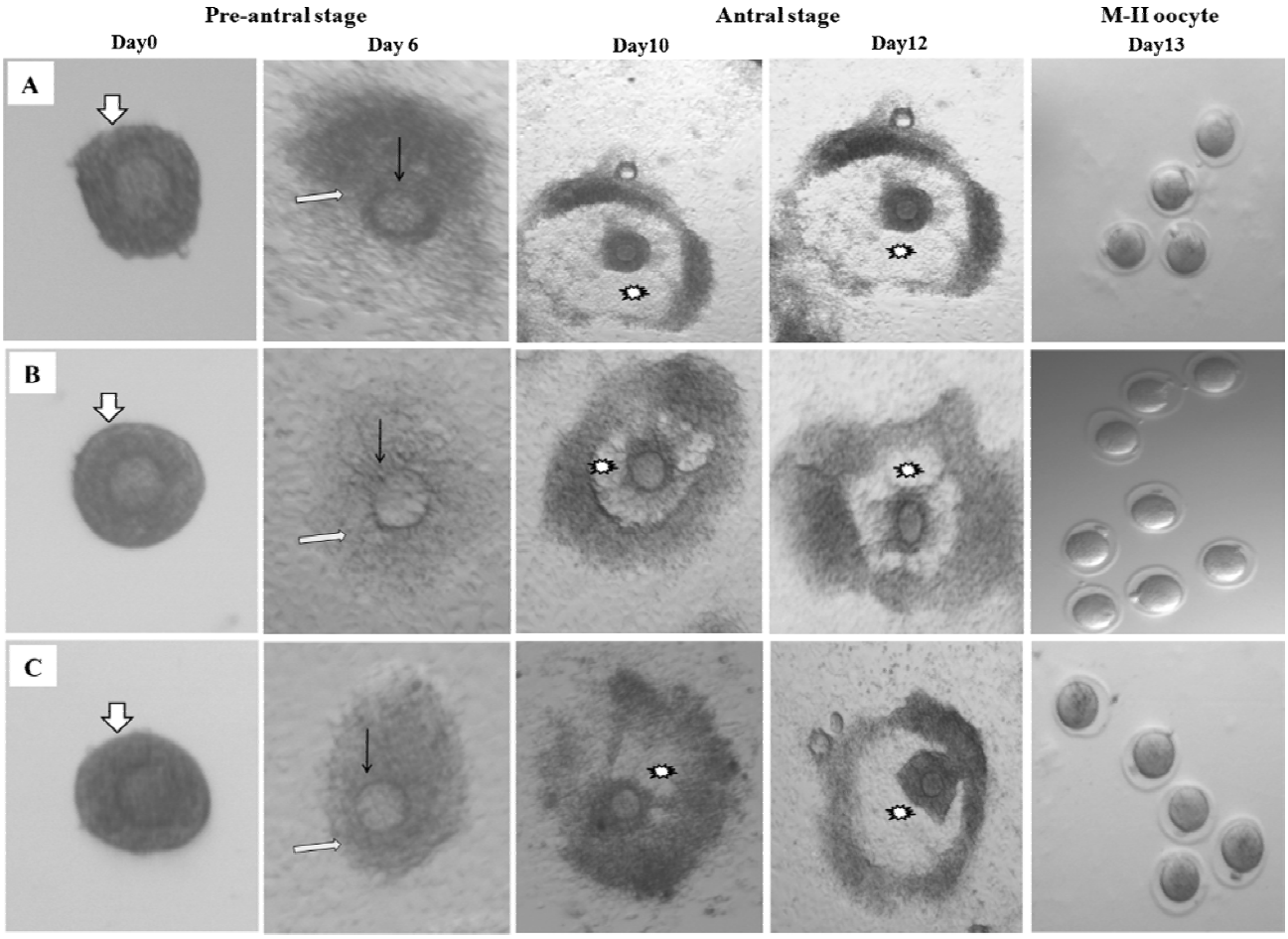


Fig: Representative microphotograph of *in vitro* culture of mice ovarian follicles

hormone (LH), 100 µg/ml penicillin, and 50 µg/ml streptomycin. After 12 d of growth, follicles were stimulated for *in vitro* maturation for 16-18 h in α-MEM supplemented with 1.5 IU/ml human chorionic gonadotrophin (hCG) and 5 ng/ml epidermal growth factor (EGF). It was observed that the initial diameter of mice oocyte (54.86 ± 2.5 µm) progressively increased in all the three insulin concentration groups and attained a maximum size on day 12 (71.90 ± 2.8 µm). Supplementation with higher concentrations of insulin (8 µg/ml and 10 µg/ml) significantly enhanced antrum formation without effecting the oocyte diameter and percent retrieval of mature oocyte. The *in vitro* cultured and *in vivo* matured follicles were compared and the oocytes showed similar localization and expression of oocyte maturation markers SAS1B and GDF9. Insulin concentration of 8 µg/ml was found to be most optimal for *in vitro* follicle culture of adult mice (42-49 days old). Optimized follicle culture conditions were also assessed successfully with pre-pubertal mice (12-14 days old). However, adult mice showed higher follicle survival, antrum formation, and more mature oocytes production in comparison to pre-pubertal mice. This model is currently in use for functional studies of candidate miRNA regulating process of follicular development. It is proposed that that this model will also be suitable as platform for basic biological studies on ovarian follicular development and could help in screening of therapeutic efficacy or toxicological impact of any agent modulating the process of ovarian follicular development ***(In Vitro Cell Dev Biol Anim. 2016 May;52(5):512-21).***

2.1.3 Oviductal peroxiredoxin 6 (PRDX6) plays as essential role in fertilization and early embryonic development

Among total female infertility cases, approximately 50 % incidences occur due to extra-uterine factors, which is yet poorly explored area. Although numerous important interactions between the fallopian tube and gametes have been recognized, there is still a need to understand the relationship between gametes and oviductal secretion, fertilization and subsequent embryo development. Also, it becomes essential to gain new insights into the oviductal factors that may be responsible for infertility and may have potential to treat infertility. Herein, the intracellular molecular factors and signaling events in the oviduct playing role in fertilization, and early embryonic development, were explored. Using differential protein profiling of ampulla from the mated animals (10.5 h post-coitum, corresponding to pre-fertilization stage of ovum) and from the non-mated animals, total 15 proteins were identified. Among the differentially expressed proteins, peroxiredoxin 6 (PRDX6) was chosen for detailed functional characterization in regulating early pregnancy events occurring in oviduct. It was reasoned that PRDX6 may play a role in maintaining a balanced redox homeostasis within the oviduct. The increased expression of PRDX6 throughout the oviduct (18-48 h p.c.) indicates that PRDX6 might play a critical role in the successful fertilization and also in early embryonic development via removal of toxic substances. During

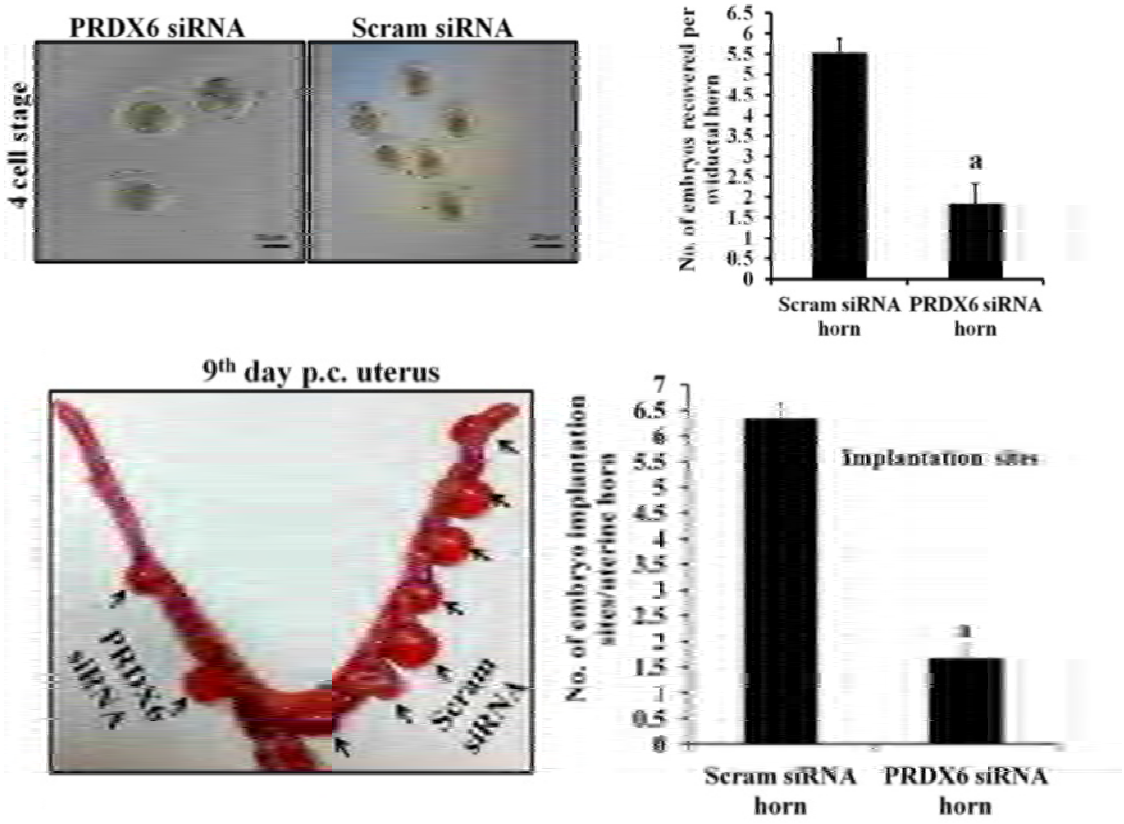


Figure 3: Intraoviductal administration of siRNA caused a significant reduction in number of (i) embryos recovered and (ii) blastocyst implantation sites.

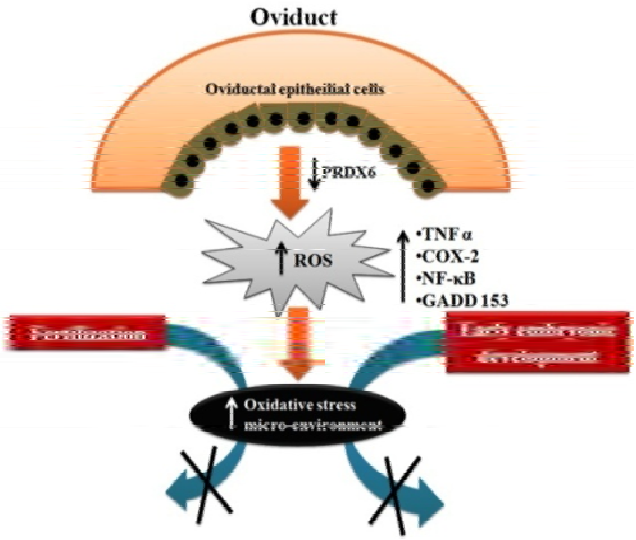
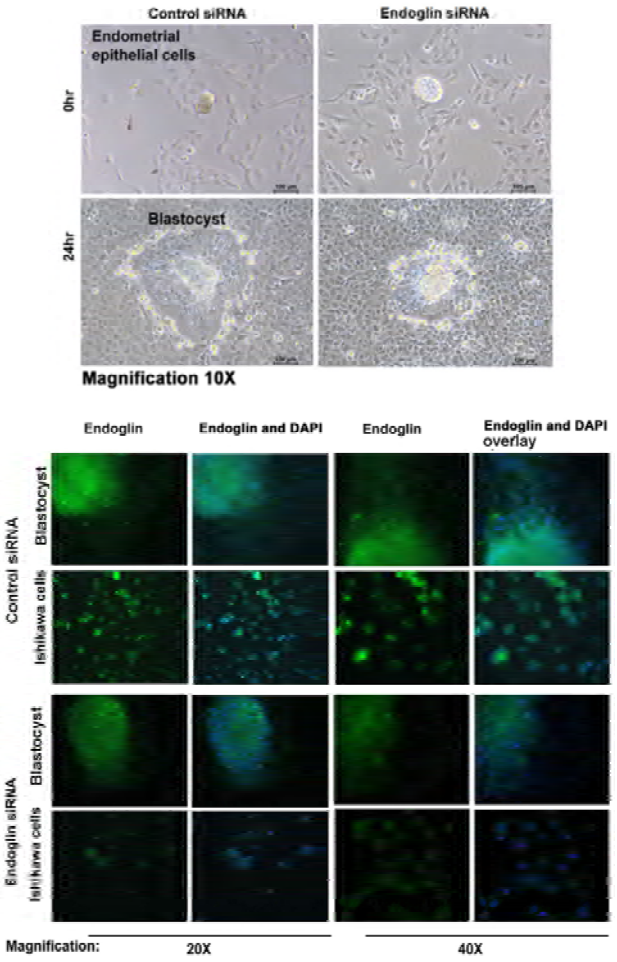


Figure 4: Proposed mechanism showing effect of PRDX6 down regulation,on fertilization and early embryonic development. PRDX6 knockdown in ROECs causes a high ROS level, concomitantly leading to upregulation of oxidative stress- and inflammation related proteins.

embryo- oviductal epithelial cell co-culture, functional blockage of PRDX6 by siRNA induced high levels of ROS and oxidative stress-associated proteins and attenuated morula to blastocyst transition with impaired inner cellular mass formation and expansion. The number of embryos was hampered along with delayed growth in embryos in animals receiving PRDX6 siRNA, which in consequence led to failure of blastocysts implantation. It has been demonstrated that PRDX6 silencing in rabbit oviductal tissue causes a high ROS production, concomitantly imposed the load of oxidative stress- associated proteins and impairment of early embryonic development leading to pregnancy failure. It is to report that the oviductal PRDX6 involvement in early pregnancy events which provides a favorable microenvironment for gametes and prepares the oviduct milieu for development of embryos leading to a successful pregnancy.

2.1.4 Endoglin (CD105) coordinates the process of endometrial receptivity for embryo implantation

Integrin and Endoglin possess one RGD domain of interaction to other proteins (ligands). Integrin β8 activates TGF-β in the endometrium to assist in the endometrial receptivity for the establishment of the pregnancy. The active form of TGF-β interacts with Endoglin and propagates signaling via SMAD2/3. Endoglin is expressed in uterine endothelial and stromal cells in addition to trophoblast expression; however, the functional role of endoglin in the endometrial receptivity was not clear. It was found that the Endoglin expressed throughout the receptivity period in the endometrium, but its expression was enhanced during the receptive stage. Endoglin was predominantly expressed in epithelial cells of the lumen and glands, and to a certain extent in the stromal cells as well. Endoglin expression was initially



observed in the primary decidual zone and later extended to the secondary decidua zone. Transient knockdown of Endoglin via siRNA reduced the implantation sites. Mouse blastocyst co-culture with Endoglin-silenced endometrial epithelial cells showed poor trophoblast outgrowth. In conclusion, findings reveal the association of Endoglin with endometrial receptivity, which is important for embryo attachment ***(Mol Cell Endocrinol. 2016 ;425:69-83).***

2.1.5 The regulation of Hh/Gli1 signaling cascade involves Gsk3β- mediated mechanism in estrogen-derived endometrial hyperplasia

Endometrial hyperplasia (EH) is a precancerous stage characterized by non-invasive proliferation of the endometrium or inner lining of the uterus. The expression of hedgehog (Hh) signaling molecules and its mediators has been shown to be correlated with ER/PR status in normal endometrium, however its regulatory mechanism during aberrant expression condition i.e. endometrial hyperplasia remains elusive. The present study was undertaken to explore the functional involvement of Hh signaling in relation to estrogen and its regulatory mechanism in endometrial hyperplasia. The differential expression of Hh signaling molecules i.e., Ihh, Shh, Gli1 or Gsk3β was observed in endometrial hyperplasial (EH)

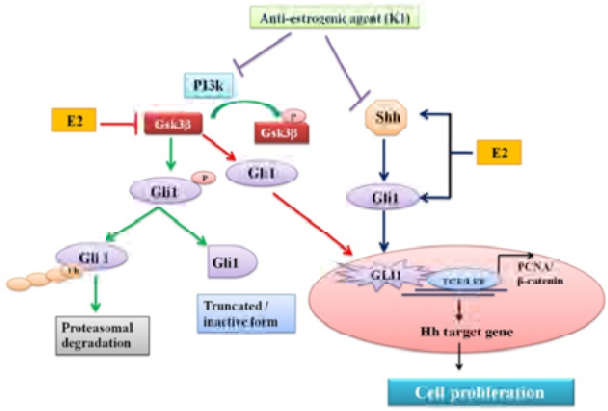


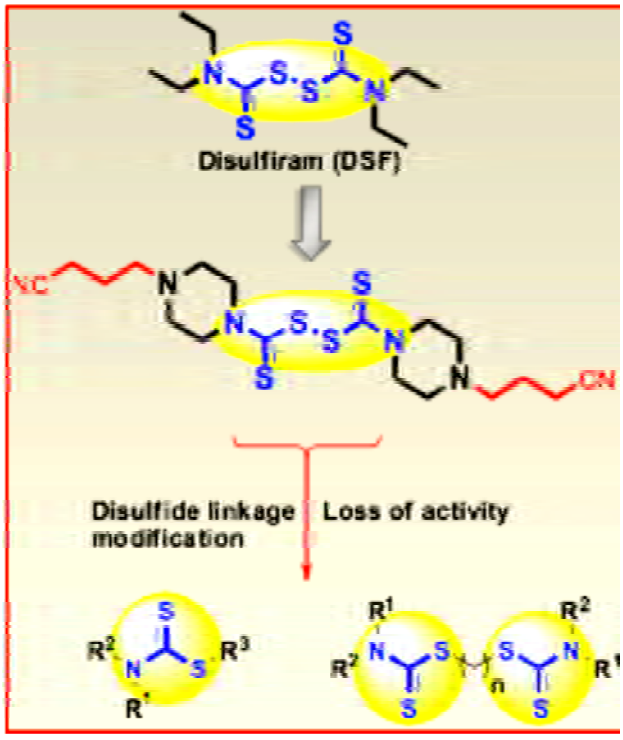
Figure 6: Schematic representation of the involvement of Hh signaling and Gsk3β-mediated regulation of Gli1 in estrogen- induced endometrial hyperplasia.

cells as compared to normal endometrial cells. Estradiol induced the expression of Hh signaling molecules and attenuated the expression of Gsk3β whereas anti-estrogenic agent (K1) or progestin (MPA) antagonized these effects in EH cells. Functional blockage of Gli1 by cyclopamine (selective inhibitor of Hh signaling) or downregulation of Gli1 by siRNA transfection suppressed the growth of EH cells and reduced the expression of proliferative markers. Estradiol also induced nuclear translocation of Gli1 which was suppressed by both MPA and K1 in cytoplasmic and nuclear compartments in EH cells. In experiments to explore the non-canonical mechanism, LY-294002 (Gsk3β activator) caused a decrease in Gli1 expression similar to that observed in cyclopamine -treated EH cells which indicates the involvement of Gsk3β in Gli1 regulation. Further, Gsk3β silencing promoted the expression and nuclear translocation of Gli1 indicating that Gsk3β serves as a negative kinase regulator of Gli1 in EH cells. Similar attenuation of Hh signaling molecules was observed in uterine hyperplasia in rats undergoing treatment with anti-estrogenic agent K1 or progestin MPA. The study suggested that Hh/Gli1 cascade (canonical pathway) and Gsk3β-Gli1 crosstalk (non-canonical pathway) play crucial role in estrogen-dependent cell proliferation in endometrial hyperplasia.

2.2 Male Reproductive System

2.2.1. Role of disulfide linkage in action of bis (dialkylaminethiocarbonyl) disulfides as potent double-edged microbicidal spermicide: Design, synthesis and biology

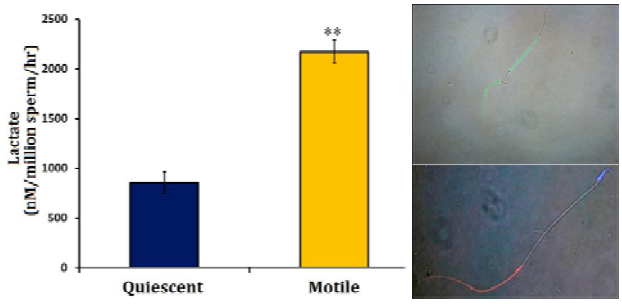
Population growth is a leading cause of environmental deterioration and human suffering from poverty and hunger. While India has a high unmet need for contraceptives with a large number of births being caused by unplanned and unintended pregnancies, common sexually transmitted infections make the situation grimmer. Vaginal contraception provides a safe, reversible and woman-controlled method of family planning. Accordingly, bis (dialkylaminethiocarbonyl)



disulfides and alkane-1,n-diyl bis(4-alkylpiperazine-1-carbodithioate) were designed as dually active, non-surfactant molecules. These molecules irreversibly immobilized 100% human sperm and eradicated *Trichomonas vaginalis* at doses that were noncytotoxic to human cervical epithelial (HeLa) cells and vaginal microflora (*Lactobacilli*) *in vitro*. The most promising structure prevented pregnancy in rabbit model and has been picked up for further study. (***European J. Med. Chem.*, 2016, 115,275-290**)

2.2.2. Energy utilization for survival and fertilization—parsimonious quiescent sperm turn extravagant on motility activation in rat

In most mammals, including rat and human, mature potentially motile sperm are stored quiescently in the cauda epididymis to conserve energy. Sperm motility initiation is coincident with ejaculation and takes place in the female genital tract; however, the molecular mechanisms involved are not known. It was discovered for the first time that quiescent sperm chiefly utilizes the energy-efficient oxidative phosphorylation to survive for long durations during storage in epididymis, but switches over to predominantly glycolytic metabolism secreting two-fold more lactate on motility initiation. This is supported by dephosphorylation of AMPK, MAPK-p38 and phosphorylation of AKT and ERK. Glycolytic inhibitor iodoacetamide prevented motility activation of quiescent rat sperm and inhibited conception in animal model more effectively than OxPhos uncoupler 2,4-dinitrophenol. This presented a proof of concept for specifically targeting sperm energy metabolism for contraception. (***Biol Reprod. 2016; 94(4):96, 1-9***)



A. B.

Figure : (A) nmoles lactate/10^6 sperm; **(B)** Accumulation of Calcium (green) in mid-piece and HIF-1 (red) in principal piece of quiescent and motile rat sperm, respectively.

2.2.3. Aldose reductase regulates spermatogenesis by affecting Sertoli cell function

Aldose reductase (AR, AKR1B1) is highly expressed in the Sertoli cells and is referred to as a marker protein for these cells. In rat, AR is present soon after birth, i.e., before the formation of occludin junctions, which represent the morphological manifestation of the blood-testis barrier (BTB). Conducted immunohistochemistry on reproductively mature rat testis sections and found that AR expression along the seminiferous epithelium decreases at stages VIII-IX (the stages at which restructuring of the BTB takes place), which suggested its participation in BTB dynamics. Immunofluorescence showed co-localization of AR with BTB constituent proteins, occluding and ZO-1, which was further confirmed by co-immunoprecipitation (Co-Ip) experiments. $CdCl_2$ based *in vivo* model of BTB disruption confirmed that BTB disruption is accompanied by a decrease in AR expression. AR knockdown by siRNA resulted in a decrease in the transepithelial electrical resistance (TER) across the *in vitro* developed seminiferous epithelium in cultured primary Sertoli cells. Western blot analysis, following *in vitro* knockdown of AR, revealed a significant decrease in the steady-state levels of certain integral membrane tight junction proteins (occludin and claudin-11) and β-catenin. AR knockdown also resulted in a significant increase in p38 and ERK1/2 MAP kinases activity along with a decrease in the level of focal adhesion kinase (FAK), a known regulator of BTB. Taking into account all the above, it is being concluded that AR forms Occludin/Zo/AR complex at the BTB and is an important regulator of BTB dynamics.

2.2.4. Obesogen exposure affects germ cell differentiation

Obesity has been recognized as a chronic inflammatory disease that leads to decreased sexual function and sexual development disorders. Identification of Obesogens and their effects on male reproductive health is of paramount importance. In the present project we successfully identified a novel obesogen, Imidacloprid and studied its mechanisms of action in male germ cells.

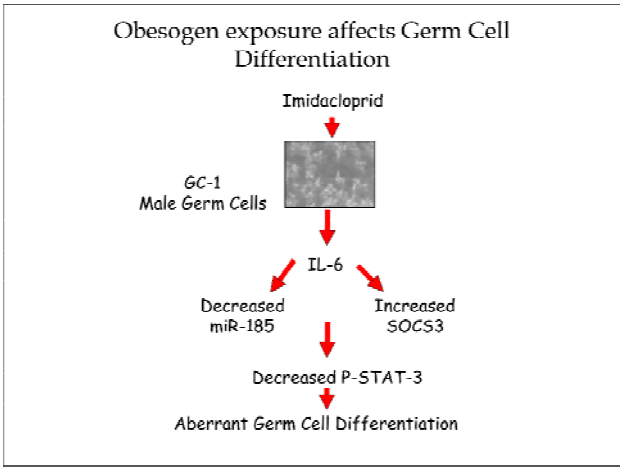


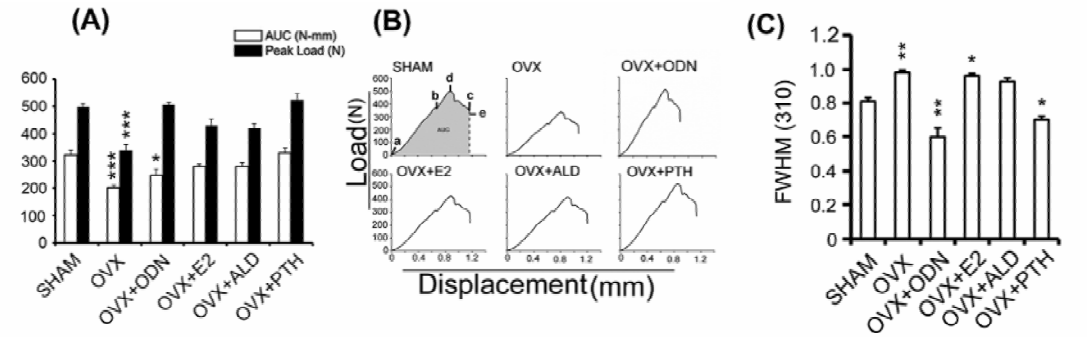
Figure: summary: obesogens and germ cell differentitation

We observed significantly higher ($p < 0.01$) levels of IL-6 in the GC-1 cells supernatants treated with Imidacloprid. It was also demonstrated that high levels of IL-6 inhibited miRNA-185 expression and elevated the SOCS-3 expression resulting in the inhibition of Phospho-STAT3, critical for germ cell differentiation. Results have confirmed that Imidacloprid induced the obesogenic inflammatory effects as indicated by the modulation of the miR185/SCOS3/STAT-3 pathway critical for the differentiation of male germ cells.

2.3 Bone health research

2.3.1 Odanacatib restores trabecular bone of skeletally mature female rabbits with osteopenia but induces brittleness of cortical bone: a comparative study of the investigational drug with PTH, estrogen, and alendronate.

Cathepsin K (CK), a lysosomal cysteine protease, is highly expressed in mature osteoclasts and degrades type 1 collagen. Odanacatib (ODN) is a selective and reversible CK inhibitor that inhibits bone loss in preclinical and clinical studies. Although an antiresorptive, ODN does not suppress bone formation, which led us to hypothesize that ODN may display restorative effect on the osteopenic bones. In a curative study, skeletally mature New Zealand rabbits were ovarectomized (OVX) and after induction of bone loss were given a steady-state exposure of ODN (9 mM/d) for 14 weeks. Sham-operated and OVX rabbits treated with alendronate (ALD), 17β-estradiol (E2), or parathyroid hormone (PTH) served as various controls. Efficacy was evaluated by assessing bone mineral density (BMD), bone microarchitecture (using micro-computed tomography), fluorescent labeling of bone, and biomechanical strength. Skeletal Ca/P ratio was measured by scanning electron microscopy (SEM) with X-ray microanalysis, crystallinity by X-ray diffraction, and bone mineral density distribution (tissue mineralization) by backscattered SEM. Between the sham and ODN-treated osteopenic groups, lumbar and femur metaphyseal BMD, Ca/P ratio, trabecular microstructure



ODN increased bone brittleness and crystallinity. (A) Determination of bone strength by three-point bending of whole femur. (B) Load vs. deformation curve generated by three-point bending of femur; elastic behavior (a-b), post yield region from start of yielding to reaching the ultimate load (b-d) and post-yield region from ultimate load to failure (d-e). (C) Assessment of crystallinity index on the basis of full width at half maximum (FWHM) of the 310 reflection. Values are expressed as mean ± SEM (n=6 rabbits/group); **P*<0.05, ***P*<0.01, ****P*<0.001 vs. sham as determined by one way ANOVA followed by Tukey's multiple comparison test.

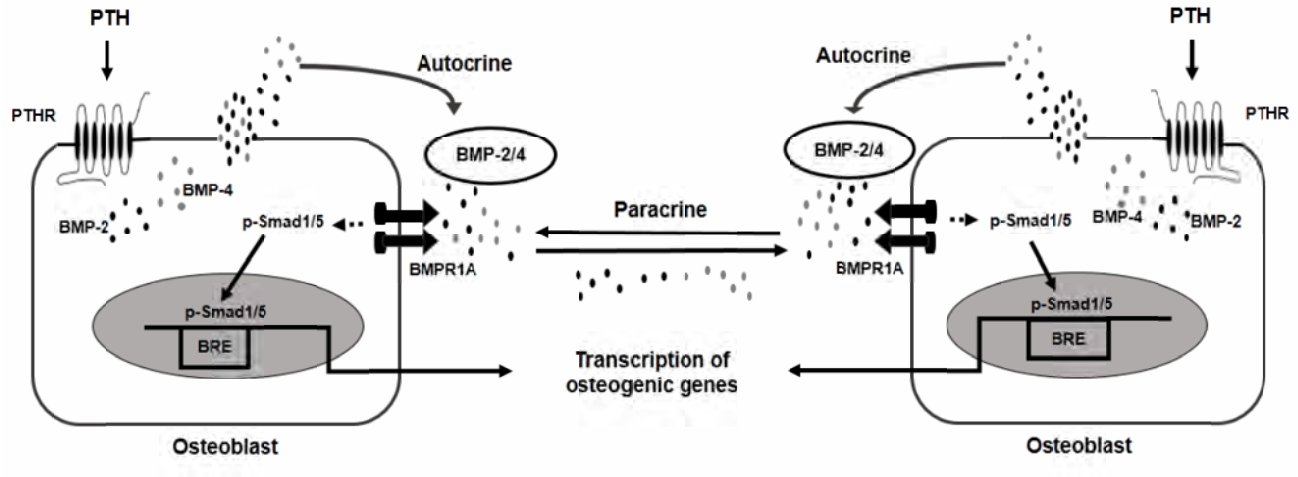
and geometric indices, vertebral compressive strength, trabecular lining cells, cortical parameters (femoral area and thickness and periosteal deposition), and serum P1NP were largely comparable. Skeletal improvements in ALD-treated or E2-treated groups fell significantly short of the sham/ODN/PTH group. However, the ODN group displayed reduced ductility and enhanced brittleness of central femur, which might have been contributed by higher crystallinity and tissue mineralization. Rabbit bone marrow stromal cells expressed CK and when treated with ODN displayed increased formation of mineralized nodules and decreased apoptosis in serum-deficient medium compared with control. *In vivo*, ODN did not suppress remodeling but inhibited osteoclast activity more than ALD. Taken together, it is showed that ODN reverses BMD, skeletal architecture, and compressive strength in osteopenic rabbits; however, it increases crystallinity and tissue mineralization, thus leading to increased cortical bone brittleness. (***J Bone Miner Res* 2016; 31:615-29**).

2.3.2 MicroRNA 874-3p exerts skeletal anabolic effects epigenetically during weaning by suppressing Hdac1 expression.

Embryonic skeletogenesis and postnatal bone development require the transfer of calcium from the mother to the offspring during pregnancy and lactation. Therefore, bone resorption in the mother becomes elevated during these periods, resulting in significant maternal skeletal loss. There follows an anabolic phase around weaning during which there is a remarkable recovery of the maternal skeleton. However, the mechanism(s) of this anabolic response remain(s) largely unknown. Identified eight differentially expressed miRNAs by array profiling, of which miR-874-3p was highly expressed at weaning, a time when bone loss was noted to recover. It is reported that this weaning-associated miRNA is an anabolic target. Therefore, an agomir of miR-874-3p induced osteoblast differentiation and mineralization. These actions were mediated through the inhibition of Hdac1 expression and enhanced Runx2 transcriptional activation. When injected *in vivo*, the agomir significantly increased osteoblastogenesis and mineralization, reversed bone loss caused by ovariectomy, and increased bone strength. It is speculated that elevated miR-874-3p expression during weaning enhances bone formation and that this miRNA may become a therapeutic target for conditions of bone loss. (***J Biol Chem*2016; 291:3959-66**).

2.3.3 BMP signaling is required for adult skeletal homeostasis and mediates bone anabolic action of parathyroid hormone.

Bmp2 and Bmp4 genes were ablated in adult mice (KO) using a conditional gene knockout technology. Bones were evaluated by microcomputed tomography (μCT), bone strength tester, histomorphometry and serum biochemical markers of bone turnover. Drill-hole was made at femur metaphysis and bone regeneration in the hole site was measured by calcein binding and μCT. Mice were either sham operated (ovary intact) or ovariectomized (OVX), and treated with human parathyroid hormone (PTH), 17 β-estradiol (E2) or vehicle. KO mice displayed trabecular bone loss, diminished osteoid formation and reduced biomechanical strength compared with control (expressing Bmp2 and Bmp4). Both osteoblast and osteoclast functions were impaired in KO mice. Bone histomorphomtery and serum parameters established a low turnover bone loss in KO mice. Bone regeneration at the drill-hole site in KO mice was lower than control. However, deletion of Bmp2 gene alone had no effect on skeleton, an outcome similar to that reported previously for deletion of Bmp4 gene. Both PTH and E2 resulted in skeletal preservation in control-OVX, whereas in KO-OVX, E2 but not PTH was effective which suggested that the skeletal action of PTH required Bmp ligands but E2 did not. To determine cellular effects of Bmp2 and Bmp4, used bone marrow stromal cells in which PTH but not E2 stimulated both Bmp2 and Bmp4 synthesis leading to increased Smad1/5 phosphorylation. Taken together, it has been concluded that Bmp2 and Bmp4 are essential for maintaining adult skeletal homeostasis and mediating the anabolic action of PTH. (***Bone* 2016; 92:132-44**).



2.3.4 Skp2 inhibits osteogenesis by promoting ubiquitin-proteasome degradation of Runx2

Osteogenic transcription factor Runx2 is essential for osteoblast differentiation. The activity of Runx2 is tightly regulated at transcriptional as well as post-translational level. However, regulation of Runx2 stability by ubiquitin mediated proteasomal degradation by E3 ubiquitin ligases is little-known. Here, for the first time it was demonstrated that Skp2, an SCF family E3 ubiquitin ligase negatively targets Runx2 by promoting its polyubiquitination and proteasome dependent degradation. Co-immunoprecipitation studies revealed that Skp2 physically interacts with Runx2 both in a heterologous as well as physiologically relevant system. Functional consequences of Runx2-Skp2 physical interaction were then assessed by promoter reporter assay. It is showed that Skp2-mediated downregulation of Runx2 led to reduced Runx2 transactivation and osteoblast differentiation. On the contrary, inhibition of Skp2 restored Runx2 levels and promoted osteoblast differentiation. It was further showed that Skp2 and Runx2 proteins are co-expressed and show inverse relation *in vivo* such as in lactating, ovariectomized and estrogen-treated ovariectomized animals. Together, these data demonstrate that Skp2 targets Runx2 for ubiquitin mediated degradation and hence negatively regulate osteogenesis. Therefore, the present study provides a plausible therapeutic target for osteoporosis or cleidocranial dysplasia caused by the heterozygous mutation of Runx2 gene. (***Biochim Biophys Acta* 2016; 1863:510-19**).

2.3.5 IL-18BP is decreased in osteoporotic women: Prevents Inflammasome mediated IL-18 activation and reduces Th17 differentiation

IL-18BP is a natural antagonist of pro-inflammatory IL-18 cytokine linked to autoimmune disorders like rheumatoid arthritis. However, its role in post menopausal osteoporosis was still unknown. In this study, investigated the role of IL-18BP on murine osteoblasts, its effect on osteoblasts-CD4+T cells and osteoblasts-CD11b+ macrophage co-culture. Mouse IL-18BP (M-IL-18BPd) was found to enhance osteoblast differentiation and inhibit the activation of NLRP3 inflammasome and caspase-1 which process IL-18 to its active form. Using estrogen deficient mice, the effect of mIL-18BP was also determined on various immune and skeletal parameters. Ovariectomized mice treated with mIL-18BPd exhibited decrease in Th17/Treg ratio and pro-inflammatory cytokines. M-IL-18BPd treatment restored trabecular microarchitecture, preserved cortical bone parameters likely attributed to an increased number of bone lining cells and reduced osteoclastogenesis. Importantly, these results were corroborated in female osteoporotic subjects where decreased serum IL-18BP levels and enhanced serum IL-18 levels were observed. This study forms a strong basis for using humanized IL-18BP towards the treatment of postmenopausal osteoporosis (***Sci Rep* 2016; 6: 33680**).

2.3.6 Theophylline, a methylxanthine drug induces osteopenia and alters calciotropic hormones, and prophylactic vitamin D treatment protects against these changes in rats.

The drug, theophylline is frequently used as an additive to medications for people suffering from chronic obstructive pulmonary diseases (COPD). Studied the effect of theophylline in bone cells, skeleton and parameters related to systemic calcium homeostasis. Theophylline induced osteoblast apoptosis by increasing reactive oxygen species production that was caused by increased cAMP production. Bone marrow levels of theophylline were higher than its serum levels, indicating skeletal accumulation of this drug. When adult Sprague-Dawley rats were treated with theophylline, bone regeneration at fracture site was diminished compared with control. Theophylline treatment resulted in a time-dependent (at 4- and 8 weeks) bone loss. At 8 weeks, a significant loss of bone mass and deterioration of microarchitecture occurred and the severity was comparable to

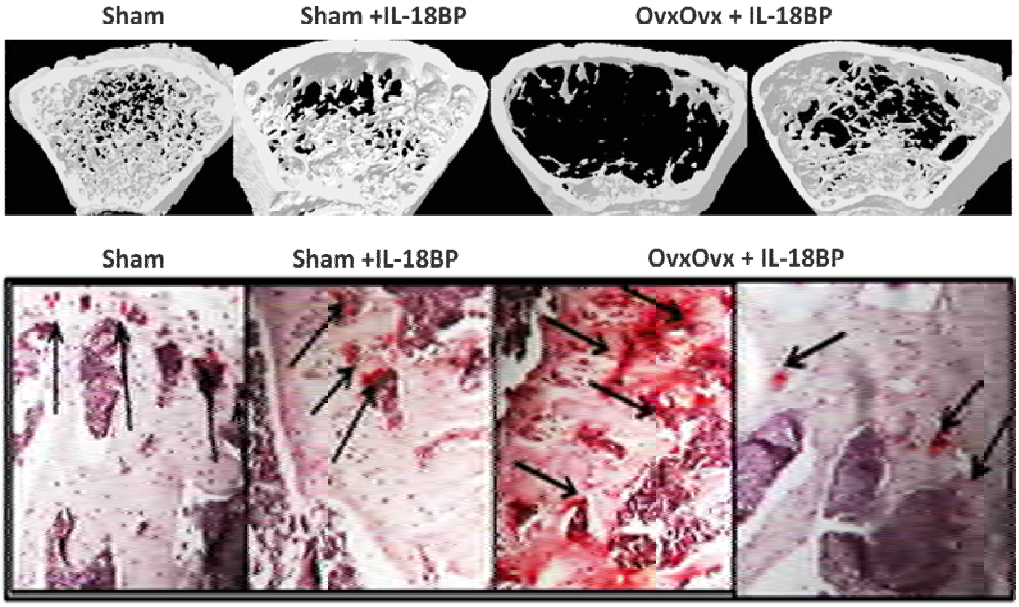
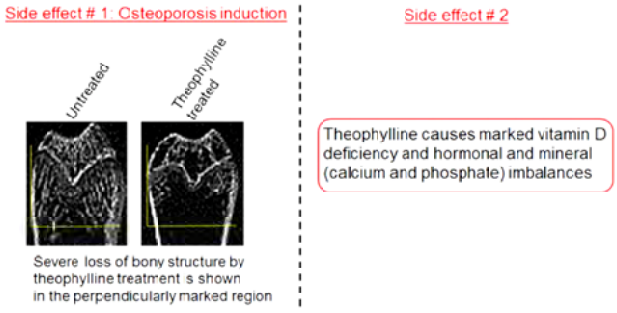
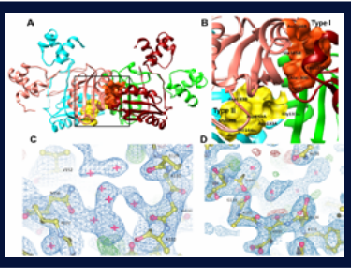


Figure. IL-18BP prevents ovariectomy-induced deterioration in trabecular bone microarchitecture and inhibits osteoclastogenesis.

methylprednisone. Theophylline caused formation of hypomineralized osteoid and increased osteoclast number and surface. Serum bone resorption and formation marker were respectively higher and lower in the theophylline group compared with control. Bone strength was reduced by theophylline treatment. After 8 weeks, serum 25-D3 and liver 25-hydroxylases were decreased in theophylline group than control. Further, theophylline treatment reduced serum 1, 25-(OH)2 vitamin D3 (1,25-D3), and increased parathyroid hormone and fibroblast growth factor-23. Theophylline treated rats had normal serum calcium and phosphate but displayed calciuria and phosphaturia. Co-administration of 25-D3 with theophylline completely abrogated theophylline-induced osteopenia and alterations in calcium homeostasis. In addition, 1,25-D3 protected osteoblasts from theophylline-induced apoptosis and the attendant oxidative stress. It is concluded that theophylline has detrimental effects in bone and prophylactic vitamin D supplementation to subjects taking theophylline could be osteoprotective. (***Toxicol Appl Pharmacol* 2016; 295:12-25**).





TUBERCULOSIS & MICROBIAL INFECTIONS

Area Coordinators: Dr Kishore K Srivastava & Dr Ravishankar Ramachandran

3

The thrust focus of the area is on development of therapeutic strategies exploiting advances in research on the disease biology. This will expectedly have a significant impact on development of technologies, vaccines and drugs for microbial infections.

The focus of the area is to push the frontiers of research on the disease biology. It includes the identification and characterization of components of diverse pathways through a combination of experimental approaches. The efforts may significantly impact the development of new drugs, technologies & vaccines for TB & Microbial Infections.

3.1 Drug Target Identification

3.2 Immunology and Subunit Vaccines

3.3 Host-pathogen Interaction

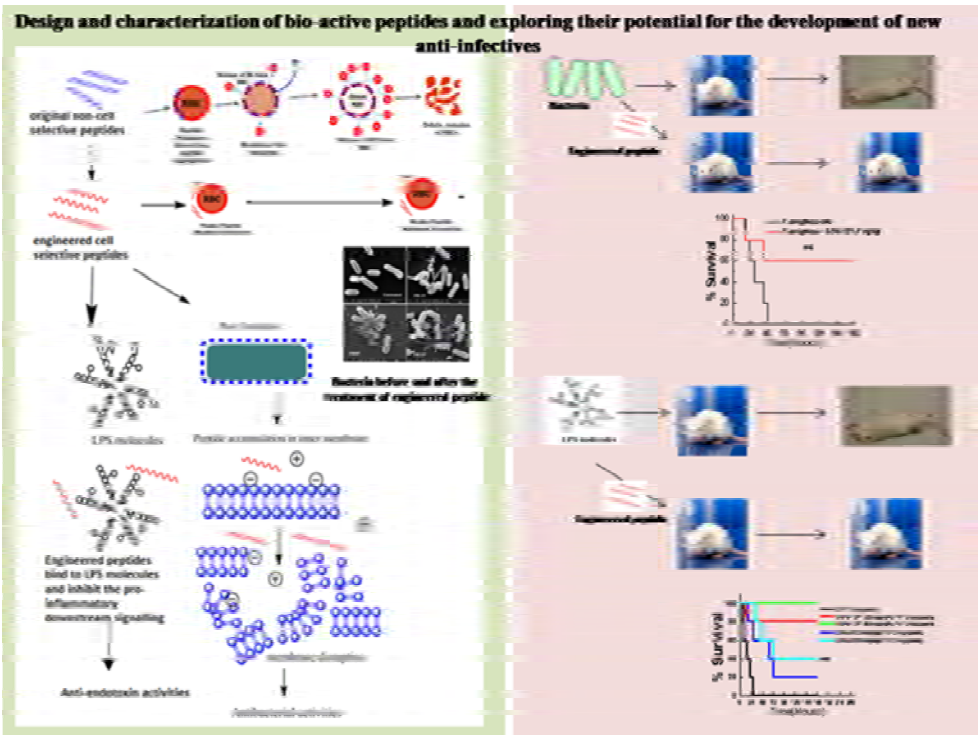
3.4 Development of Antimicrobial Peptides

3.5 *In silico* evaluation of new potential targets and inhibitors

Highlights of advancing the knowledge frontier

A novel design strategy for development of bio-active peptides as anti-infectives

Emergence of drug-resistance in microorganisms is a serious threat throughout the world. Antimicrobial peptides (AMPs), identified in almost all living organisms are considered to be lead molecules for developing new antimicrobial agents for their versatile activity against microorganisms and contrasting mode of action to conventional antibiotics. Unlike conventional antibiotics, majority AMPs mainly target the membrane of the organisms and lyse them in a few minutes. It is generally thought that development of resistance against these peptides will not be easy for the microorganisms. Due to presence of cationic charge AMPs possess inherent higher specificity for the negatively charged membrane of microorganisms. However, since membrane is a kind of non-specific target, beyond certain concentrations these AMPs start losing specificity and begin showing cytotoxicity against mammalian cells also.



Therefore, one of the issues in converting a naturally occurring AMP into a lead molecule is its cell-selectivity. The team in CDRI led by Dr. J.K. Ghosh's group has developed new approaches for introducing selectivity in these peptides so that they only lyse the microorganisms without harming mammalian cells. Initially, the approach showed that a leucine zipper motif (LZP) in mellitin, an AMP from bee venom, was not needed for bactericidal activity and its removal removed unwanted toxicity (*J. Biol. Chem. 279, 55042-55050, 2004*). Subsequently the efforts identified a vital role of hydrophobic amino acids located at both 'a' and 'd' positions of similar heptad repeat sequences (phenylalanine and isoleucine zipper) in cytotoxicity of other AMPs (*Biochemistry (ACS) (2009) 48:10905-10917; BBA (Biomembrane) (2009) 1788 2411-2420; Biochemistry 2010, 49, 7920–7929*). Subsequently the influence of different hydrophobic amino acids at 'a' and 'd' positions of a heptad repeat sequence on antimicrobial, cytotoxic and anti-endotoxin properties were studied and provided the foundation for the design of novel AMPs with varying anti-endotoxin and

cytotoxic properties using heptad repeats as the template based on temporin L and piscidin-1 (*J. Med. Chem. 2013;56:924-39; Biochem J. 2016. 473(21):4045-4062*). It was realized that only very selective amino acid substitution in such peptide sequences can reduced their cytotoxicity against mammalian cells without significantly compromising their desirable anti-endotoxin property. This led to the design of cell-selective analogs of piscidin-1 with very significant *in vitro* and *in vivo* anti-endotoxin property by incorporating single amino acid substitutions at the 'a'/'d'

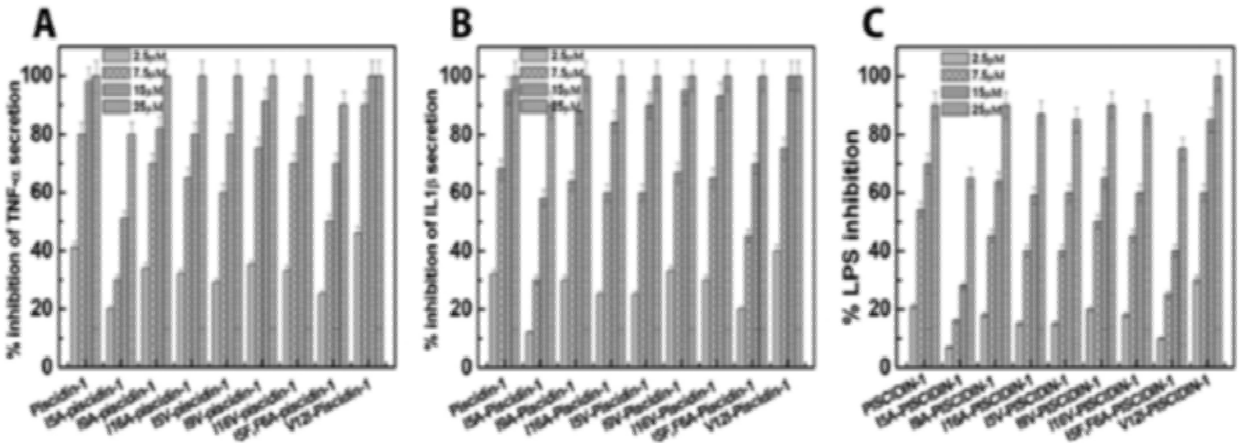


Figure legend: A & B, percent inhibition of levels of LPS-induced secretion of TNF-α (A) and IL-1β (B) in the presence of piscidin-1 and its analogs determined by ELISA. C, Dose-dependent LPS neutralization by piscidin-1 and its analogs determined by the LAL assay. The results are representative of three independent experiments [*Antimicrob. Agents Chemother. 60, 3687-3699 (2016)*].

position of its identified heptad repeat sequence (*AAC 2016 60(6):3687-99*).

Recently the team designed and characterized a novel 15-residue peptide that showed negligible cytotoxicity but protected mice against P. aeruginosa (ATCC BAA-427) infection and against LPS challenge. These studies illustrate a plausible correlation between aggregation properties of these peptides in LPS and detoxification of LPS in their presence (*Indian patent filed No. 201611009443; March 2016*).

The novel peptide design strategies outlined above are presently being exploited for development of anti-infectives by the team.

3.1 Drug target identification

3.1.1 Study of carbon and nitrogen metabolic pathways of *Mtb* for their suitability as a source of new drug targets

Threonine dehydratase is a pyridoxal 5-phosphate dependent enzyme required for isoleucine biosynthesis. Threonine dehydratase (IlvA) participates in conversion of threonine to 2-oxobutanoate and ammonia is released as a by-product. Herein, developed a recombinant (KD) *Mtb*-Ra strain by down-regulating IlvA. The KD showed reduced survival under pH, starvation, nitric oxide and peroxide stresses. The expression profiling of IlvA suggested increased expression of IlvA during oxygen, acid, nitric oxide and peroxide stress. Also, recombinant *Mtb*-Ra was more susceptible to antimycobacterial agents such as streptomycin (STR), rifampicin (RIF) and levofloxacin (LVF), while, no increase in susceptibility towards isoniazid was observed. In addition, an increase in expression of IlvA was observed when exposed to STR, RIF and LVF. The dye accumulation studies suggested increased uptake/accumulation of ethidium bromide and Nile Red in KD as compared to WT (***Scientific Reports***, **6:27997, 2016**).

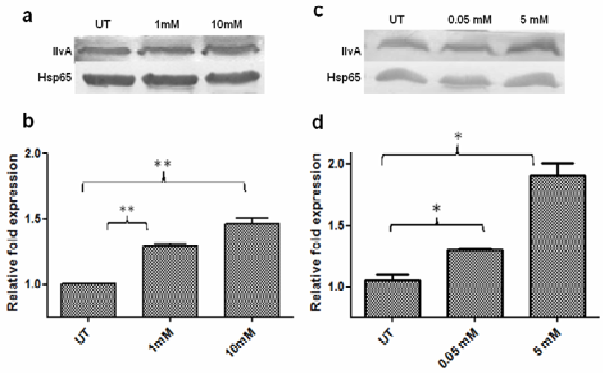


Figure 1. Expression of IlvA under nitric oxide and peroxide stress. Both WT and KD were exposed to different concentrations of hydrogen peroxide and DETA-NO and protein abundance was monitored by immunoblotting. Both a and b represent immunoblot and densitometry of IlvA from untreated and treated with 1 mM and 10 mM hydrogen peroxide. Both c and d represent immunoblot and densitometry of IlvA from untreated and treated with 0.05 mM and 5 mM DETA-NO. Hsp65 was used as a loading control. Results are mean ± SEM from three independent experiments performed in triplicate, significance analysis was done by Student's *t*-test, * p <0.05, * * <0.01, * * * p <0.001.

3.1.2 Shikimate kinase is important for growth and survival of mycobacteria

The molecular bases of disease provide exceptional prospect to translate research findings into new drugs.

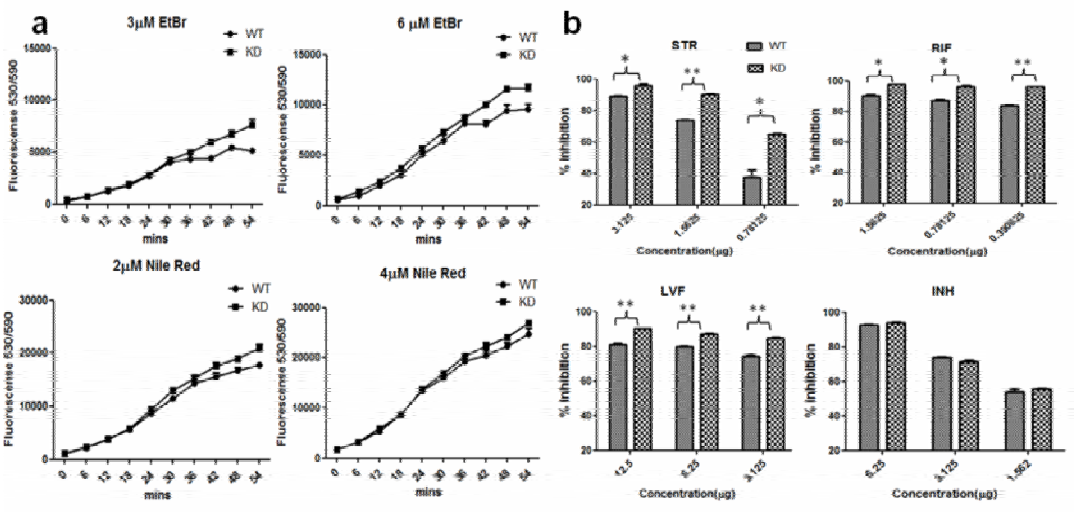


Figure 2. Effect of knockdown on cell permeability and susceptibility to antimycobacterial agents. (a) Whole cell uptake studies with EtBr and Nile Red were performed using both WT and KD. EtBr was studied at 3 and 6 ìM concentrations, while, Nile Red was studied at 2 and 4 ìM concentrations. (b) Susceptibility to antimycobacterial agents was studied with both WT and KD. Antimycobacterial agents studied were Streptomycin (STR), Levofloxacin (LVF), Rifampicin (RIF) and Isoniazid (INH). Results are mean ± SEM from three independent experiments performed in triplicate, significance analysis was done by Student's *t*-test, * p <0.05, * * <0.01, * * * p <0.001.

Nevertheless, to develop new and novel chemical entities takes huge amount of time and efforts, mainly due to the stringent processes. Therefore, drug repurposing is one of such strategies which is being used in recent times to identify new pharmacophores. The essential first step in discovery of the specific inhibitor with low toxicity is the identification and elucidation of pathways exclusive to target pathogen. One such target is the shikimate pathway, which is essential for algae, higher plants, bacteria and fungi. Since, this enzyme system is absent in higher eukaryotes and in mammals, the enzymes involved in the pathway provide an attractive target for the development of potentially selective and non toxic antimicrobial agents. Since, so far there is no specific inhibitor which is able to restrain mycobacterial shikimate pathway; herein expanded the use of a known kinase inhibitor; Rottlerin, in order to predict the prototype in discovering the specific molecules against this enzyme. For the first time it has been shown that Rottlerin inhibits extracellular mycobacteria by affecting Shikimate Kinase (SK) and this effect is further enhanced during the intracellular infection due to the added effect of PKC-δ downregulation. The molecular docking of Rottlerin with both the mycobacterial SKs, corroborated the inhibition data, and revealed that the effects of SK, in slow and in fast grower mycobacteria are due to the changes in affinity of binding with the drug. ***(Biochem Biophys Res Commun. 2016; 478(2):721-6).***

3.1.3 Peptidyl-tRNA Hydrolase as anti-microbial drug target

In this study, structurally characterized the potent and validated anti-microbial drug target enzyme, peptidyl-tRNA hydrolase (Pth). Determined the structures of Pth proteins from *Vibrio cholerae* (VcPth) and *Mycobacterium smegmatis* (MsPth) byusing NMR spectroscopy. Solved X-ray crystal structures for VcPth and for six of its functional mutants. These studies have revealed the dynamics of the conserved catalytic site residues. This characterization will be very helpful in design of inhibitors, which may be further developed into anti-microbial agents ***(Biochim Biophys Acta. 2016;1864(10): 1304-14).***

3.1.4 *M. tuberculosis* HAD phosphatase (Rv3042c, SerB2) interacts with host proteins and is inhibited by Clofazimine

M. tuberculosis codes for a HAD- phosphatase, Rv3042c (MtSerB2), that has earlier been characterized as a metabolic enzyme. Here it has been demonstrated that MtSerB2 is secreted into the cytosol of infected macrophages and is found in bronchoalveolar lavage (BAL) samples of tuberculosis patients. MtSerB2 induces significant cytoskeleton rearrangements through cofilin activation and affects the expression of genes that regulate actin dynamics. It specifically interacts with HSP90, HSP70 and HSP27 that block apoptotic pathways and not with other HSPs. It actively dephosphorylates MAPK-p38 and NF-kappa B p65 that play crucial roles in inflammatory and immune responses. This in turn leads to down-regulation of Interleukin 8 (IL-8), a chemotactic and inflammatory cytokine. Finally, during evaluation of inhibitors against MtSerB2, found that Clofazimine, a drug

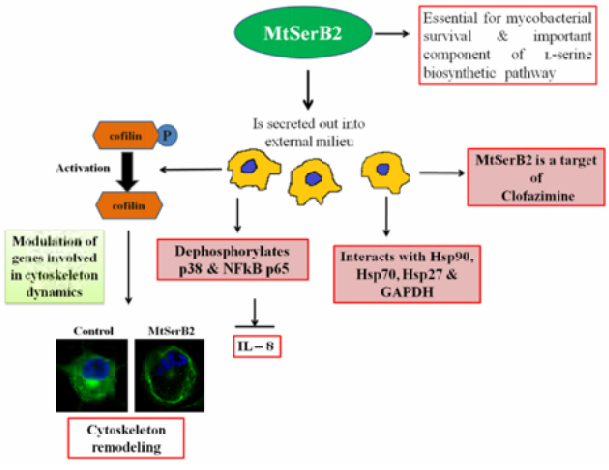


Figure: Schematic diagram summarizing the multifunctional properties of MtSerB2

being evaluated for XDR and MDR tuberculosis, inhibits MtSerB2 phosphatase activity and reverses the above effects and interactions with host proteins. Overall, the study identifies that MtSerB2 has new functions that might help the pathogen to evade the host's immune response (Cell. Md. Life Sci. 73, 3401-3417, 2016).

3.1.5 Crystal structure of *Mycobacterium tuberculosis* H37Rv AldR (rv2779c), a regulator of the ald gene: DNA-binding, and identification of small-molecule inhibitors

In this study, solved and reported the crystal structure of *M. tuberculosis* AldR (rv2779c). The structure shows that the N-terminal DNA-binding domains are swapped forming a dimer and four dimers are assembled into an octamer through crystal symmetry. The C-terminal domain is involved in oligomeric interactions that stabilise the oligomer, and contains the effector-binding sites. The latter sites are 30-60 % larger compared to homologs like MtbFFRP (rv3291c) and can consequently accommodate larger molecules. MtbAldR binds to the region upstream to the *ald* gene that is highly up-regulated in nutrient-starved TB models, and codes for L-alanine dehydrogenase (MtbAld; Rv2780). Further, the MtbAldR-DNA complex is inhibited upon binding of Ala, Tyr, Trp and Asp to the protein. Studies involving a ligand-binding site G131T mutant show that the mutant forms a DNA-complex which cannot be inhibited by adding the amino acids. Comparative studies support that binding of the amino acids changes the relative spatial disposition of the DNA-binding domains and thereby disrupt the protein-DNA complex.

Finally, identified small-molecules, including a tetra hydroquinoline carbonitrile derivative (S010-0261), that inhibits the MtbAldR-DNA complex. The latter molecules represent the very first inhibitors of an FFRP from any source and sets the stage for exploring MtbAldR as a potential anti-TB target ***J. Biol.Chem. 291,11967-11980,2016***).

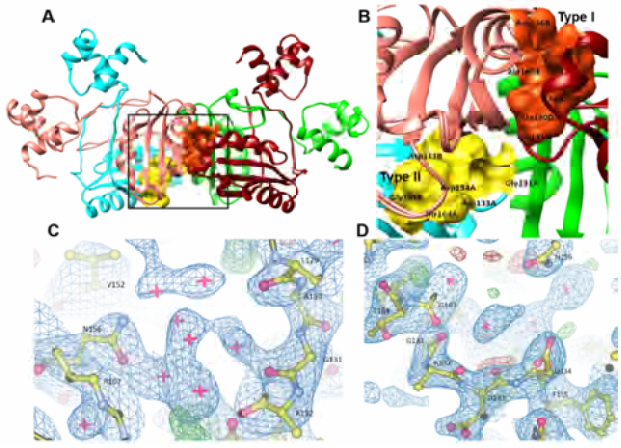


Figure: Delineation of the ligand binding sites of MtbAldR

3.2 Immunology and subunit vaccines

3.2.1 Immunodominant antigens of mycobacteria

Studies are aimed at discovering novel proteins that could lead to the development of a subunit/booster vaccine against tuberculosis. In this study, determined the immunological response against three culture filtrate proteins from *Mycobacterium tuberculosis* H37Rv viz. Rv1197, Rv1198, and Rv3111 (MoaC1), using BALB/c mice as the model organism. All of the proteins/antigens elicit strong IgG titers in immunized mice. Moreover, the antigens also elicit strong recall responses from cultured splenocytes, which is characterized by high lymphocyte proliferation and specific cytokine induction. All of these proteins have been found to be moderately-to-highly seroreactive towards the sera of TB patients***(Biochim Biophys Acta. 2016 Apr;1860(4):694-707; Biochim Biophys Acta. 2016 Oct 15. pii: S0304-4165(16)30388-9).***

3.2.2 Generation of monoclonal antibodies

Studies on *Aspergillus fumigatus* causing aspergillosis in immunocompromised patients were continued with a view to develop monoclonal antibodies against cell surface proteins since they may be an important target for new antifungal drug development. The cell surface proteins isolated from 5 days old culture of *A. fumigatus* in Sabouraud's dextrose broth were used to immunize BALB/c mice and the spleen cells from these fused with sp2/0 cells to get hybridoma clones. The hybridoma clones producing MAbs were single cell cloned and the resulting MAbs isolated. Two hybridoma clones from separate fusion experiments were isolated producing MAbIgM (R-5) and MAb IgG (R-16) using

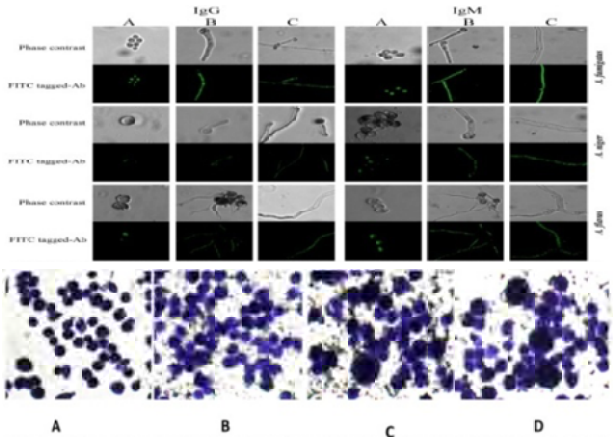


Figure: The MTT assay with both the MAbs exhibited fungicidal effect against different *Aspergillus sp.* [*A. fumigatus* (IgM = 24.62% and IgG1 = 16.86%)> *A. flavus*> *A. niger*] *and* negligible effect against other fungi. The effect of the two MAbs on phagocytosis was studied using mouse macrophase J774 cell line. Co-incubation of MAb(R-5) as well as MAb (R-16) with the swollen conidia of *A. fumigatus* significantly enhanced the phagocytosis Fig 1.2. The effect of these two MAbson reduction of CFU in different *Aspergillus* sp. was studied by co-incubating (overnight) the MAbs with respective conidia exhibited *in vitro* inhibitory activity [*A. fumigates*> *A. flavus*> *A. niger*]. A maximum of 88.6% and 84.65% reduction in CFU was observed against *A. fumigatus*by MAb ((R-5) and MAb (R-16) respectively. Further characterization and peptide sequencing of these two MAbs is being continued.

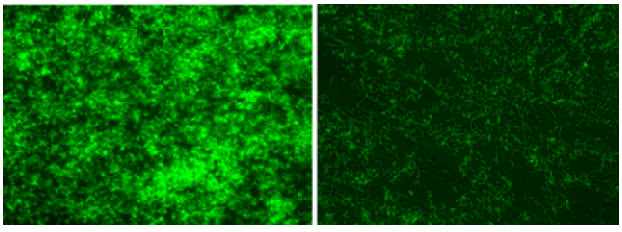
isotyping kit. The localization of cell surface antigen using by MAb IgM and IgG in swollen conidia, germinated spores, and mycelium of different *Aspergillus species* (*A. flavus, A. niger and A. fumigatus)* and other fungi (*Candida albicans*, *Trichophyton mentagrophytes*) was tested by indirect immunofluorescence analysis indicating highest binding on *Aspergillus* species (*A. fumigatus*> *A. flavus*> *A. niger)* and no binding on surface of other fungi Fig.

3.3 Host-pathogen Interaction

3.3.1 *Mycobacterium bovis SigF* mutant is deficient in surface phenomenon

SigF is widely conserved in mycobacteria and plays a major role in the regulation of virulence genes in *M. tuberculosis*. In this study, created a Δ*sigF* mutant in *M. bovis*which exhibits deficiency in biofilm, pellicle and cords formation and enhanced cellular permeability. Recombinant *M. bovis* wild type and *"sigF* mutant strains expressing green fluorescent protein (GFP) constitutively through $hsp60_{pr}$ were thinly smeared on glass slides and examined under FLoid® Cell Imaging Station. Wild type bacterial colonies appeared as aggregates embedded in extracellular matrix of biofilm, while Δ*sigF* mutant bacteria were sparsely distributed in substantially reduced biofilm matrix.

Surface exposed molecules of the cell envelope have been shown to play crucial role in initial adhesion of bacteria as well as in the subsequent surface colonization during the process of biofilms development. The presence or absence of different lipids on the surface of *M. bovis* could affect its surface interactions; while the biofilm associated waxy extracellular lipids could reduce the permeability of the envelope and induce the drug tolerance properties. To monitor changes in the cell wall components, two-dimensional thin-layer chromatography (2D-TLC) was carried out for both apolar and polar lipids extracted from Mb10 (Δ*sigF* mutant) and wild type *M. bovis* bacterial colonies. Appreciable differences in lipid profiles were noticed between the Mb10 mutant and the wild type cells of which trehalose 6-6'-dimycolate (TDM), the cord factor, trehalose 6-monomycolate (TMM) and phthiocerol dimycocerosate (PDIM) appeared the most conspicuous. Cord factor TDM is the most abundant lipids in *M. tuberculosis* cell wall and is believed to have a crucial role in the structure and function of the mycobacterial cell



M. bovis^{+} *M. bovis*Δ*sigF*

Figure. Apparently reduced biofilm matrix in *M. bovis* Δ*sigF* mutant in comparison to wild type

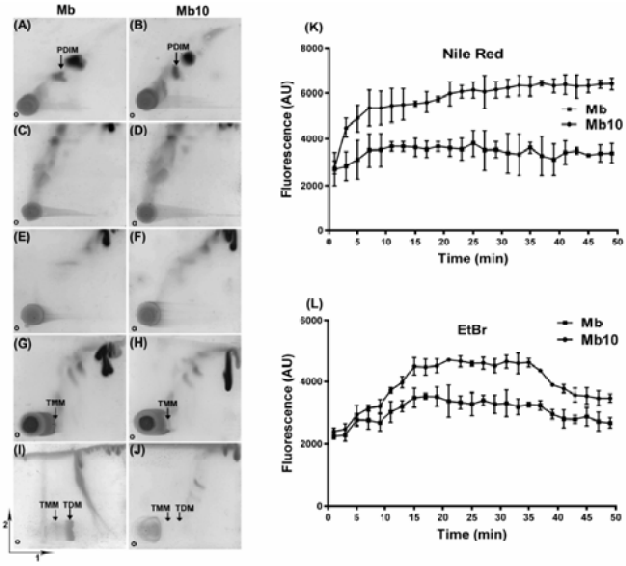


Figure. 2D-TLC analysis of nonpolar lipids from *M. bovis* wild type (A, C, E, G) and Mb10 Δ*sigF* mutant (B, D, F, H) and of polar lipids from *M. bovis* wild type (I) and Mb10 Δ*sigF* mutant (J). The arrows indicate the missing lipids in Mb10 Δ*sigF* mutant. PDIM - Phthiocerol dimycocerosate, TMM - Trehalose monomycolate, TDM - Trehalose dimycolate. Whole cell accumulations of Nile red (K) and EtBr (L) by *M. bovis* wild type (Mb) and "*sigF* mutant (Mb10) were measured using fluorescence spectroscopy. Mb10 exhibits more accumulation of Nile Red and EtBr than the *M. bovis* wild type.

envelope. The climbing pattern of *M. tuberculosis* pellicles along the wall of flasks is attributed to TDM. PDIM is reported to have a role in virulence, as PDIM-deficient *M. tuberculosis* exhibits growth defects in multiple animal models.

3.3.2 PE_PGRS family protein in intracellular survival of mycobacteria

Pathogenic mycobacteria produce a wide set of cell-surface associated proteins of the PE_PGRS family whose functions remain unclear. In the present work, MMAR_0242, a PE_PGRS member from *M. marinum* was characterized by a unique extended C-terminal domain. Due to its reduced ability to inhibit lysosomal fusion, growth of *M. marinum* mutant defective in MMAR_0242 production was severely impeded in *A. castellanii*, macrophages and zebrafish embryos. Furthermore,

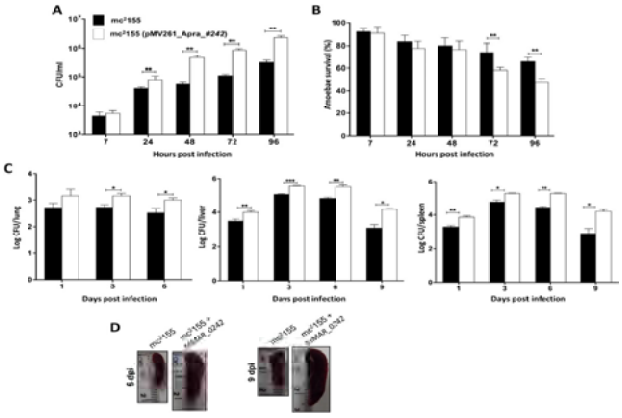


Figure. MMAR_0242 increases survival and persistence of *M. smegmatis* in amoebae and mice.

expression of MMAR_0242 in *M. smegmatis*, a non-pathogenic species naturally deficient in PE_PGRS production, resulted in increased survival in amoebae with enhanced cytotoxic cell death and increased survival in infected mice with splenomegaly. Overall, these results indicate that MMAR_0242 is required for full virulence of *M. marinum* and sufficient to confer pathogenic properties to *M. smegmatis*. [***Cellular Microbiol, 2016***]

3.3.3 Role of adipose tissue in latent TB

Mycobacterium tuberculosis (*Mtb*), the causative agent of tuberculosis has the remarkable ability to persist as non-replicating forms in the host. These persisters are tolerant to drugs targeting actively replicating bacilli and hence are responsible for the need of an extended duration of anti-tubercular therapy. The anatomical locations and cell types housing *Mtb* persisters are being investigated in the recent times. Adipose tissue and the adipocytes are proposed niches of *Mtb* persisters. In the present study, experiments were carried out in the immunocompetent Swiss mice to see the dissemination of *Mtb* from lungs to adipose tissue and *vice versa*. Mice infected intra-nasally with ~10^6, 10^4 or 10^2 bacilli harboured *Mtb* in various adipose depots distal to the lungs such as the visceral, subcutaneous and peri-renal depots. The dissemination was minimal at two weeks post-infection, as evident from culture negative adipose tissue samples. But at seven weeks post-infection, viable *Mtb* could be detected in 78%, 66% and 66% of the samples from high, moderate and low dose-infection groups respectively. In a separate experiment, *Mtb*-infected pre-adipocytes were implanted subcutaneously to un-infected mice. At five weeks post-implantation, the intact implants had a mean 7 ± 0.53 $\log_{10}$ CFUs/100 mg tissue, while the lungs had a mean 3.25±0.32 $\log^{10}$ CFUs /100 mg tissue. In conclusion, the study shows that *Mtb* can disseminate from lungs to distant adipose depots and vice versa.(*Microb Pathog. 2016 Apr;93:32-7)*

3.3.4 Transcriptional adaptation of *M. tuberculosis* to a lipid environment

During its persistence in the infected host, *Mycobacterium tuberculosis* (*Mtb*) accumulate host-derived fatty acids in intra-cytoplasmic lipid inclusions as triacyl glycerols (TAG) which serve primarily as carbon and energy reserves. The *Mtb* genome codes for more than fifteen triacyl glycerol synthases (TGS), twenty four lipase/esterases and seven cutinase-like proteins. Hence looked at the expression of the corresponding genes in intra-cellular bacilli persisting amidst of host TAG. In the study, used the *Mtb* infected murine adipocyte model to ensure persistence and transcripts were quantified by real time reverse transcriptase PCR. Dormancy and glyoxylate metabolism was confirmed by the up-regulated expression of *dosR* and *icl*respectively by intra-adipocyte bacilli compared to *in vitro* growing bacilli. The study revealed that tgs1, tgs2, Rv3371 and mycolytransferase Ag85A are the predominant TGS, while lipF, lipH, lipJ, lipK, lipN, lipV, lipX, lipY, culp5, culp7 and culp6 are the predominant lipases/esterases used by *Mtb* for the storage and degradation of host derived fat. Moreover, it was observed that many of these enzymes are used by *Mtb* during active replication rather than during non-replicating persistence, indicating their probable function in cell wall synthesis. (***Int J Mycobacteriol. 2016; 5(1):92-8***).

3.3.5 Cellular interaction of HIV-Nef

This study focuses on the identification of HIV-1 Nef (Negative factor) cellular interacting partners and development of synthetic peptides useful as anti-HIV therapeutics. Nef plays an indispensable role in immune evasion of HIV-1 in infected cells by modulating the expression of cell surface proteins and directing apoptosis of bystander $CD8^+$ cells. Herein, identified various cellular proteins interacting with Nef as well as Nef interacting domain to corresponding protein involved in infectivity and pathogenesis. Nef $EEEE^{65}$ domain interacts with PACS1/2 fbr which down regulates the cell surface MHC-1 through multi-kinase assembly. This study identified an inhibitor molecule against Nef-PACS-1 interaction, through a novel mammalian two-hybrid and will inhibit a pathway initiated with Nef-PACS-1 interaction which down regulate MHC-I from cell surface to trans-Golgi. In another event, Nef-ASK interaction inhibits apoptosis in infected CD4 T cells by death receptor interaction. In this study, identified novel inhibitor and developed screening model for Nef-ASK-1 interaction. These two novel reporter gene constructs Nef-PACS-1 and Nef-ASK1, and their inhibitor are patented.

3.4 Development of Anti-microbial Peptides

3.4.1 Modulation of anti-endotoxin property of Temporin L by minor amino-acid substitution in identified phenylalanine zipper sequence

13-residue frog antimicrobial peptide Temporin L (TempL) possesses versatile antimicrobial activities and is considered as a lead molecule for the development of new antimicrobial agents. To find out the amino acid sequence(s) that influence the antimicrobial property of TempL, a phenylalanine zipper like sequence was identified in it which was not reported earlier. To evaluate the role of this motif, several alanine/leucine-substituted analogs were designed and synthesized after replacing phenylalanine residues at ‘a’ and/or ‘d’ position(s) of the heptad repeat sequence of TempL with alanine/leucine residues and also characterized them. Overall, the results demonstrated how minor amino acid substitutions in the identified phenylalanine zipper sequence in TempL could yield its analogs with better antibacterial and/or anti-endotoxin properties with their plausible mechanism of action ***(Biochemical Journal (2016) 473 4045–4062)***.

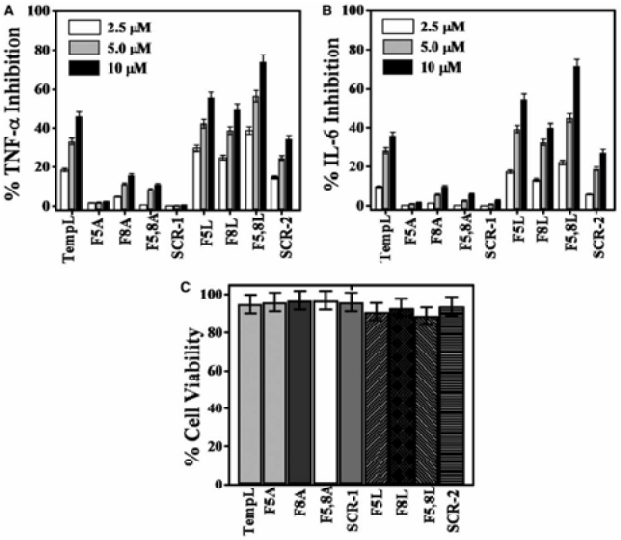


Figure: Effect of treatments of TempL or its analogs on production of pro-inflammatory cytokines in rat BMDMs stimulated with LPS (100 ng/ml). (A) & (B) represent the percentage inhibition of LPS-induced TNF-α and IL-6 production in macrophages by TempL and its analogs at different concentration as marked in the figure. (C) Depicts the viability of macrophage cells by trypan blue assay after above experiment at maximum employed peptide concentration (10 μM).

3.4.2 Single amino acid substitutions at specific positions of the heptad repeat sequence of piscidin-1 yielded novel analogs that show low cytotoxicity as well as *in vitro* and *in vivo* anti-endotoxin activity

Piscidin-1, a 22-residue naturally occurring antimicrobial peptide of fish origin possesses both significant antimicrobial and cytotoxic activities. To recognize primary amino acid sequence(s) in piscidin-1 that could be important for its biological activity, a long heptad repeat sequence located in the amino acid region 2 to 19 was identified. To comprehend the possible role of this motif, overall eight analogs of piscidin-1 were designed, synthesized and characterized. I16A-piscidin-1, the piscidin-1-analog with highest therapeutic index, at a single dose of 1 and 2 mg/Kg showed 80 and 100% survival of 12 mg/Kg LPS-treated mice. Structural and functional characterization of these peptides revealed the basis of their biological activity and demonstrated the design of non-toxic piscidin-1-analogs with significant antimicrobial and anti-endotoxin activities by incorporating single alanine substitutions in its heptad repeat ***(Antimicrobial Agents & Chemotherapy 2016; 60(6): 3687-3699)***.

3.4.3 Temporin L antimicrobial peptide is highly optimised, further alteration in the sequence or structure reduces the antimicrobial activity

Antimicrobial peptides (AMPs) are the promising future therapeutic candidates because of their multifunctional roles and unique mode of action against microbes. Among temporins, TL is small, linear (FVQWFSKFLGRILNH2) and broad spectrum antimicrobial peptide with intriguing biological properties. TL not only displays highest antibacterial activity but also shows higher and broader range hemolytic against human erythrocytes, different cell lines. The major barrier in developing TL as a novel therapeutic antimicrobial agent is its ability to cause detectable hemolysis at MIC concentration. To investigate whether fluorination of peptides alters the antimicrobial activity and reduce the toxicity, we have natural phenylalanine with fluorinated variant in the sequence.

In antimicrobial assays, fluorinated TL analogues showed a lower activity than the TL and control peptides. Aggregation of the peptides is required for the membrane permeabilization, and fluorination reduces the aggregation. Results also clearly demonstrate that as fluorination increases, the antimicrobial activity reduces substantially. Strangely, this phenomenon is found in all

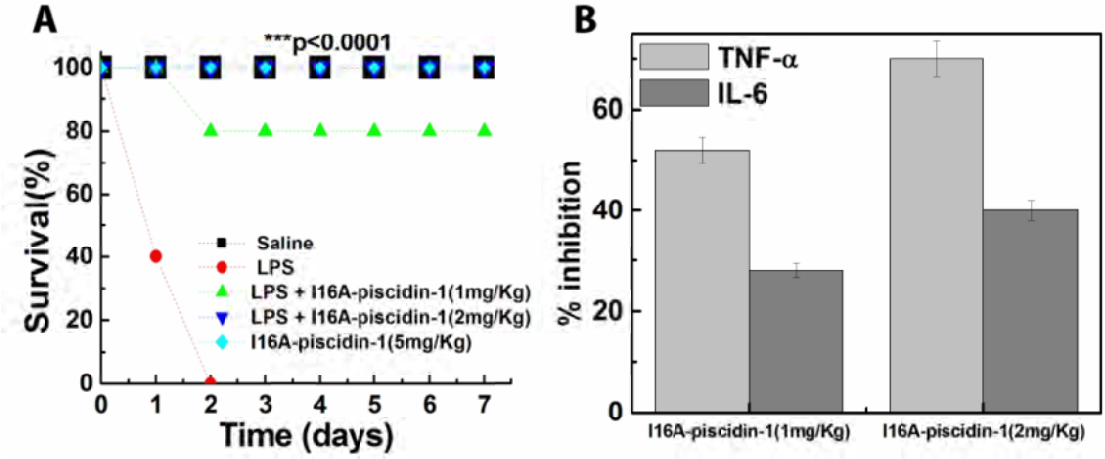


Figure: Effects of I16A-piscidin-1 against LPS challenge *in vivo* in mice. (A) Septic shock in BALB/c mice was induced by intraperitoneal (i.p.) injection of *E. coli* LPS (12 mg/kg) followed by i.p. injection of a single dose of I16A-piscidin-1 (1 mg/Kg or 2 mg/Kg) or only saline ~5 min later. Cytotoxicity of I16A-piscidin-1 was examined by i.p injection of a single dose of 5 mg/Kg of I16A-piscidin-1 in mice and mice group treated with only saline employed as negative control. Survival of the animals (n = 5) was monitored for 7 days (***p< 0.0001, log-rank test) and (B) Determination of % inhibition of TNF-α and IL-6 production in mouse serum 4 hr post LPS and I16A-piscidin-1 injection.

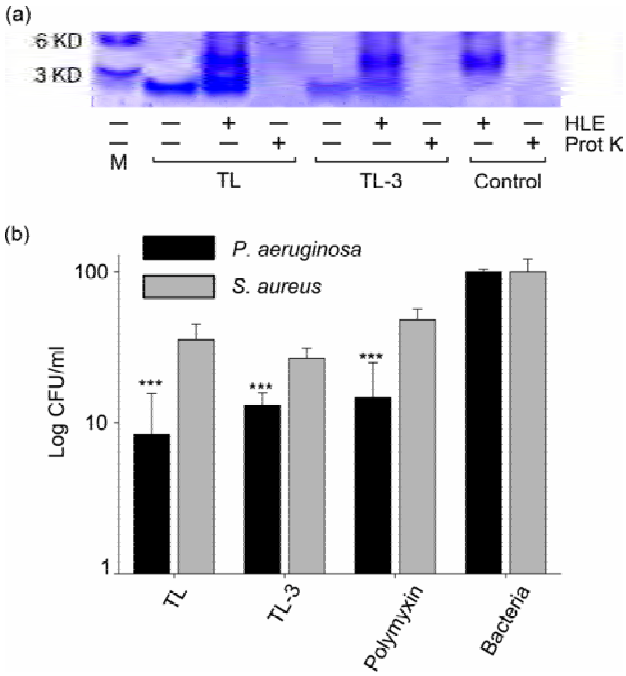


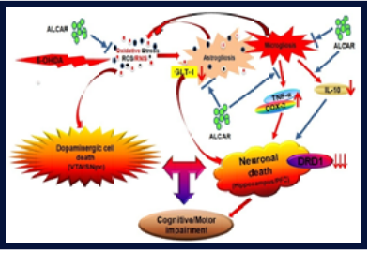
Figure: Protease sensitivity (human leukocyte elastase (HLE) and Proteinase K) of the fluorinated TL analogues. Activities of TL peptides in *ex vivo* Pig skin infection model against two different bacterial strains *P. aeruginosa* clinical isolate 556 or *S. aureus* ATCC 29213. The difference between fluorinated and non-fluorinated peptide is statistically significant in all cases (P\0.002, one way ANOVA).)

the fluorinated TL peptides irrespective of the position where the fluorinated amino acid is present. It is interesting to observe that the peptide did not lose their antimicrobial activity in the presence of the salt or plasma, as in the case of the toxicity and showed similar activity to that of control peptide polymyxin B-sulphate. These results stress the point that highly hydrophobic peptide should be tested in the physiological as well as activity relevant conditions then in buffers alone. Based upon the results and other researcher results, who have tried to reduced the toxicity and increase the activity by using various other route, it is quite evident that any alterations in the temporin leads to lowering of the activity only. No significant gain is obtained in terms of activity or toxicity.

3.5 *In silico* evaluation of new potential targets and inhibitors

3.5.1 Computational evaluation of Glutamine synthetase as drug target against infectious diseases: Molecular modelling, substrate binding analysis and molecular dynamics simulation studies

Glutamine synthetase (GS) is an enzyme which catalyses the condensation of glutamate and ammonia to form glutamine in the presence of ATP. The wealth of structure related information about GS across the species is endorsing it as emerging potential drug target. Owing to its well characterized role in metabolism of *Mycobacterium*,various high throughput screening studies have been aimed at the identification of inhibitors against MtGS. The present work is focused on comparative sequence and structural studies of GS and its evaluation as drug target against the infectious diseases.The structure models and molecular dynamics simulations studies shed light to the binding modes of substrates viz. ADP, glutamate, ammonia and metal ions.The comparative studies of MtGS, HsGS, LmGS and PvGS helped in better understanding of prospects of structure based inhibitor design. The results suggest that amino acid binding site is highly conserved whereasnucleotide binding site possess subtle variations and thus offers opportunity for specific inhibitor design. Therefore, present study suggests that broad spectrum GS inhibition is feasible and it is potential drug target against infectious diseases *(Accepted Manuscript 2016, Med Chem Res).*



CVS, CNS AND RELATED DISORDERS

Area Coordinators: Dr Manoj Barthwal& Dr PN Yadav

4

The research and development activities in CVS-CNS and related disorders comprises advancing the knowledge frontier in biomedical aspects of following disorders:

- Cardiovascular system (Hypertension, Pulmonary hypertension, Dyslipidemia, Atherosclerosis, Thrombosis and Myocardial Infarction)
- Central nervous system (Depression, Neurodegeneration, Dementia and Stroke)
- Other related disorders (e.g., Inflammation)

Highlights of advancing the knowledge frontier

Role of Fatty Acid Synthase in Pulmonary Hypertension

In network programme THUNDER, we are trying to understand the metabolic aspects of cardiovascular diseases. As a part of this programme, we focussed on unravelling metabolic dysfucntion especially lipid metabolism in Pulmonary hypertension (PH), a progressive cardiopulmonary disease, which is characterized by increased pulmonary arterial pressure and right ventricular hypertrophy (RVH) which culminates into right ventricular heart failure. The soldiers and natives living at higher altitude suffer from PH associated with high altitude pulmonary edema. Moreover, it is very much prevalent as a secondary disorder in chronic heart disease (75%), hemoglobinopathies (10%), HIV infection (0.5%), schistosomiasis (4.6%), sickle cell disease (25%), and most importantly in chronic obstructive pulmonary disease (COPD, 90%). PH is a fatal disease and in cases where PH goes untreated, the long-term outlook is grim. There is a 68 percent chance of survival after one year which drops to 34 percent after five years. Recent studies have shown that, similar to cancer, there is altered energy metabolism, apoptosis resistance and cellular proliferation leading to pulmonary vascular remodelling in PH. Proliferating cells exhibit higher rate of *de novo* fatty acid synthesis to provide lipids for membrane formation and energy production. However, involvement of *de novo* fatty acid synthesis has not been explored till date in PH.

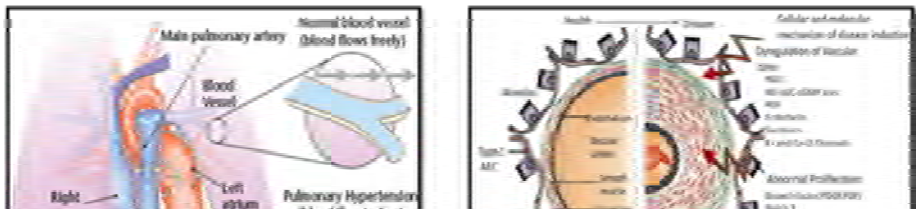


Fig 1: Hypoxic conditions lead pulmonary vasoconstriction and structural remodelling. This results in increased pulmonary arterial blood pressure which leads to right ventricle hypertrophy.

In our study, we found increased activity and expression of Fatty Acid Synthase (FAS), an important enzyme in *de novo* fatty acid synthesis, in hypoxic human pulmonary artery smooth muscle cells (HPASMCs) and in lungs of monocrotaline (MCT, 60 mg/kg, subcutaneous single administration and rats left for 35 days) treated rats.

Inhibition of FAS by siRNA decreased activity and expression of FAS, palmitate level, proliferation, autophagy and insulin resistance in HPASMCs but also increased the glucose oxidation/glycolysis ratio and apoptosis. FAS inhibition also improved

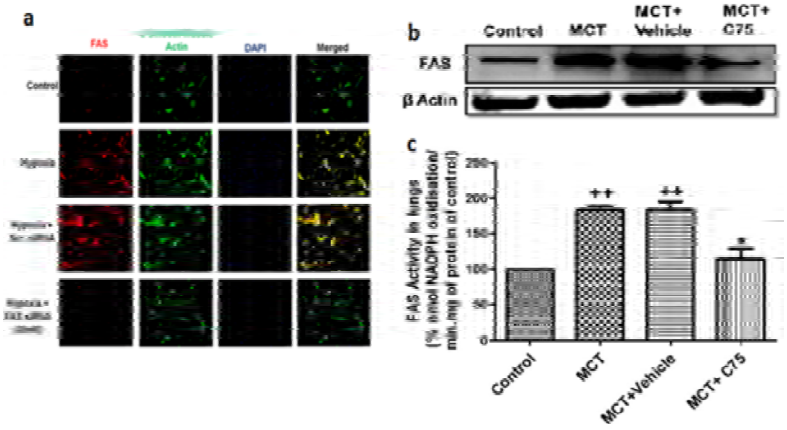


Fig 2: (a) Hypoxic exposure of human pulmonary arterial smooth muscles cells (HPASMCs) showed enhances Fatty acid Synthase expression which was inhibited by FAS siRNA. (b) FAS inhibitors C75 decreased FAS expression and (b) activity in lungs of MCT treated rats.

the mitochondrial dysfunction by increasing mitochondrial reactive oxygen species and attenuated the hyperpolarisation of membrane which ultimately lead to apoptosis. The inhibition of FAS by C75 (2 mg/kg, i.p., oral, weekly for 5 weeks) decreased the right ventricle pressure and cardiac hypertrophy in MCT induced PH in rats. Pulmonary vascular remodelling was also attenuated by C75 in *in vivo* studies.

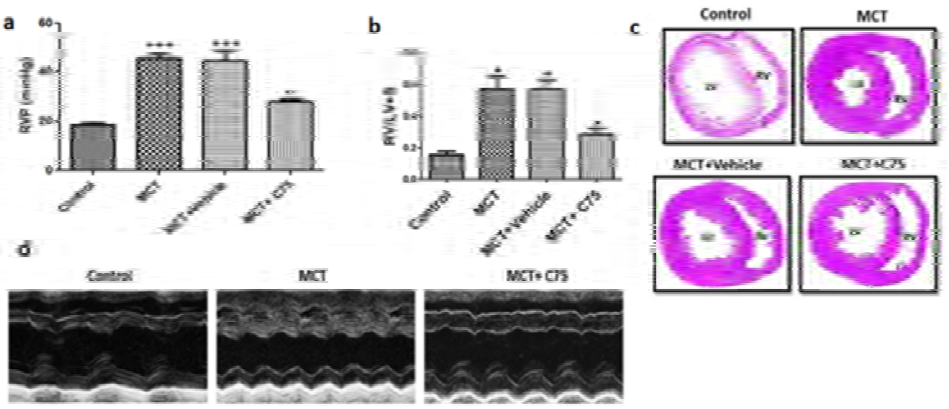


Fig 3: FAS inhibition by C75 decreased (a) right ventricle pressure (b) weight (c) hypertrophy (d) right ventricle wall thickness as analyzed by 2D echocardiography in MCT treated rats.

In PH, injury in pulmonary vasculature causes apoptosis and activation of endothelial cells, which favours the emergence of apoptosis-resistant and proliferative endothelial cells responsible for vascular oculopathy and formation of plexiform lesions. In our work, hypoxic human pulmonary artery endothelial cells (HPAECs) showed increased expression and activity of FAS. siRNA mediated inhibition of FAS increased apoptosis and glucose oxidation but decreased cellular proliferation, autophagy and glycolysis in hypoxic HPAECs. FAS inhibition decreased the angiogenesis as evident by decreased tubule length and VEGF expression in hypoxic HPAECs. Inhibition of FAS also increased expression of endothelial NOS in hypoxic HPAECs, a marker of endothelial function. In *in vivo* studies, we found that the acetylcholine induced relaxation was impaired in pulmonary vessels isolated from MCT-treated rats and FAS inhibition by C75 improved endothelial dysfunction in isolated pulmonary artery.

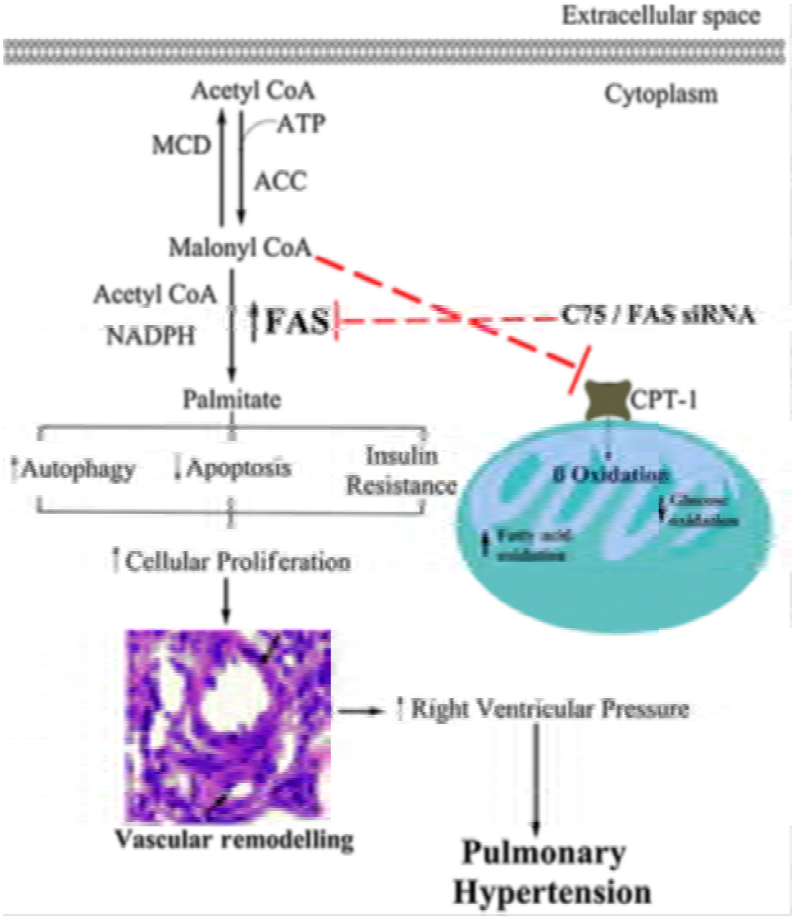


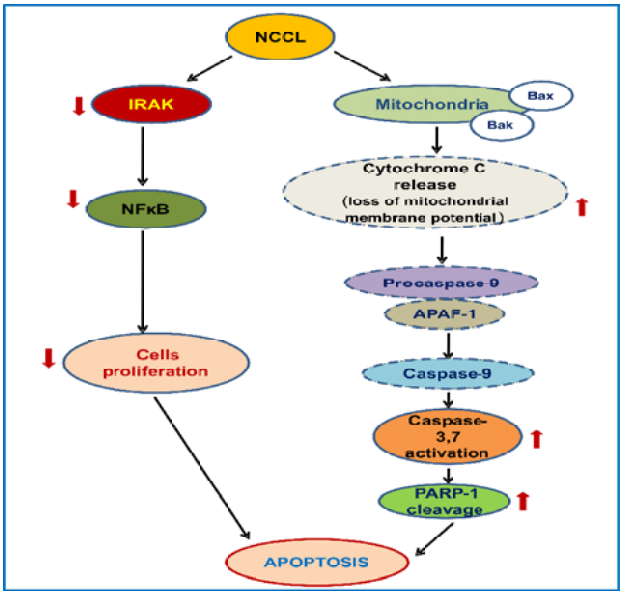
Fig 4: Proposed model of involvement of FAS in pathophysiology of PH. Elevated FAS activity increases level of free fatty acid, that is, palmitate, which leads to insulin resistance like condition, decreased apoptosis, cellular proliferation in pulmonary vasculature. These changes result in pulmonary vascular remodelling which leads to increased right ventricle pressure and hypertrophy in lungs during PH.

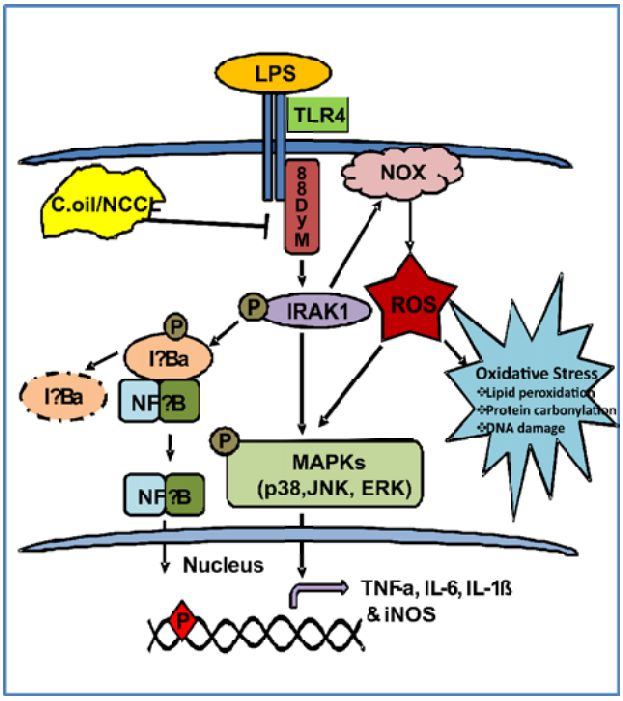
Right ventricular hypertrophy in PH leads to heart failure. There was an increased expression and activity of FAS in hypoxic hypertrophied cardiomyocytes and right ventricular of MCT treated rats. Inhibition of FAS by siRNA in hypoxic cardiomyocytes and by C75 in MCT treated rats decreased the FAS expression and palmitate level. Inhibition of FAS also decreased the cardiac hypertrophy, inflammation, apoptosis and autophagy and also improved the glucose oxidation in hypoxic cardiomyocytes. FAS inhibition restored the mitochondrial membrane potential and ATP level in hypoxic cardiomyocytes. In MCT-treated rats, FAS inhibition by C75 decreased right ventricular hypertrophy, apoptosis in RV and also improved cardiac function. In this study, for the first time, we showed that the alteration *in de novo* fatty acid synthesis in PH and inhibition of FAS can be protective in pulmonary hypertension and associated cardiac hypertrophy.

4.1 Advancing the Knowledge Frontiers

4.1.1 A standardized chemically modified curcuma longa extract modulates IRAK-MAPK signaling in inflammation and potentiates cytotoxicity.

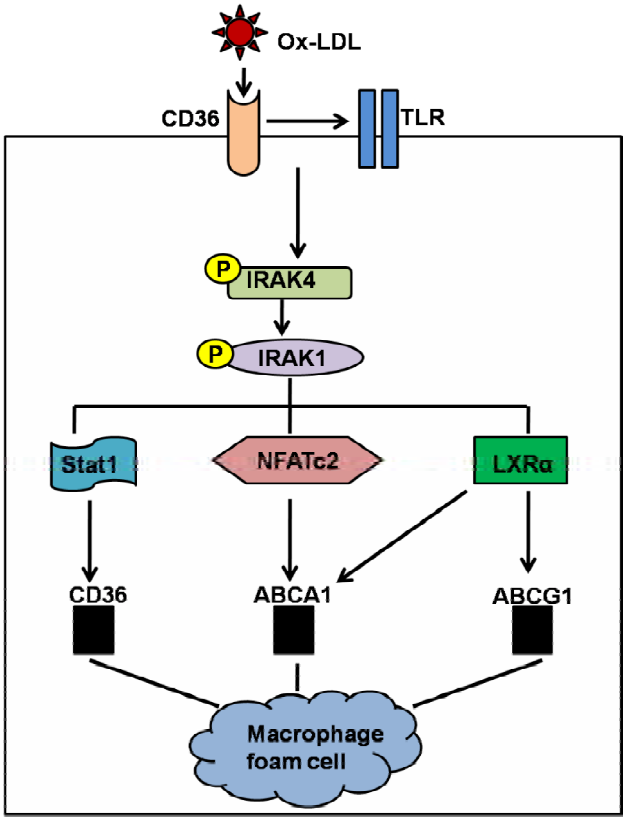
The TLR/IL-1R pathway is a critical signaling module that is misregulated in pathologies like inflammation and cancer. Extracts from turmeric (*Curcuma longa* L.) enriched in curcumin and carbonyls like turmerones have been shown to exert potent anti-inflammatory effects. The present study evaluated the anti-inflammatory activity, cytotoxic effect and the underlying mechanism of a novel chemically modified, non-carbonyl compound enriched Curcuma longa L. (C. longa) extract (CMCE). CMCE (1 or 10 µg/mL; 14 h) significantly decreased LPS (50-100 ng/mL) induced TNF-α and IL-1β production in THP-1 cells, human, and mouse whole blood as measured by ELISA. LPS-induced IRAK1, MAPK activation, TLR4 expression, TLR4-MyD88 interaction, and IκBα degradation were significantly reduced in CMCE pre-treated THP-1 cells as assessed by Western blotting. CMCE (30, 100, and 300 mg/kg; 10 days p.o.) pre-treated and LPS (10 mg/kg) challenged Swiss mice exhibited attenuated plasma TNF-α, IL-1β, nitrite, aortic iNOS expression, and vascular dysfunction. In a PI permeability assay, cell lines derived from acute myeloid leukemia were most sensitive to the cytotoxic effects of CMCE. Analysis of Sub-G1 phase, Annexin V-PI positivity, loss of mitochondrial membrane potential, increased caspase-3, and PARP-1 activation confirmed CMCE induced apoptosis in HL-60 cells. IRAK inhibition also sensitized HL-60 cells to CMCE induced cytotoxicity. The present study defines the mechanism underlying the action of CMCE and suggests a therapeutic potential for its use in sepsis and leukemia. **(Front Pharmacol. 2016 Jul 25;7:223)**





4.1.2 IRAK regulates macrophage foam cell formation by modulating genes involved in cholesterol uptake and efflux.

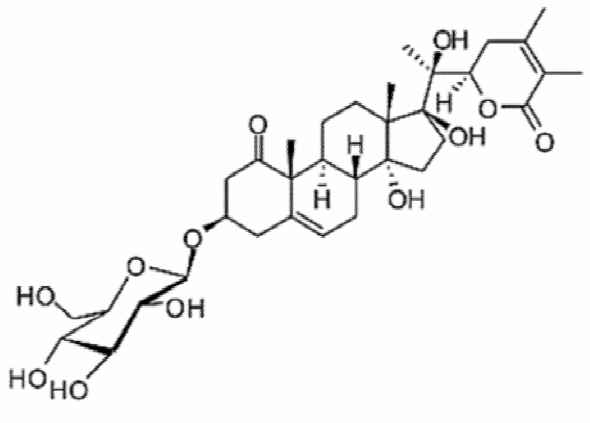
Interleukin-1 receptor-associated kinase-1 (IRAK1) is linked to the pathogenesis of atherosclerosis; however, its role in macrophage foam cell formation is not known. Therefore, the present study investigated the role of IRAK1 in lipid uptake, biosynthesis, and efflux in THP-1 derived macrophages and human monocyte-derived macrophages (HMDMs). Ox-LDL (40 µg/mL, 15 minutes-48 hours) treatment induced time-dependent increase in IRAK1, IRAK4, and Stat1 activation in THP-1 derived macrophages. IRAK1/4 inhibitor (INH) or IRAK1 siRNA significantly attenuated cholesterol accumulation, DiI-Ox-LDL binding, and uptake while cholesterol efflux to apoAI and HDL was enhanced in THP-1 derived macrophages and HMDMs. Ox-LDL treatment significantly increased the mRNA expression of CD36, LOX-1, SR-A, ABCA1, ABCG1, Caveolin-1, CYP27A1 while that of SR-BI was decreased. IRAK1/4 inhibition or IRAK1 knockdown, however, attenuated Ox-LDL-induced CD36 expression; augmented ABCA1 and ABCG1 expression while expression of others was unaffected in THP-1 derived macrophages and HMDMs. Moreover, IRAK1/4 inhibition had no significant effect on genes involved in lipid biosynthesis. In IRAK1/4 INH pre-treated THP-1 derived macrophages Ox-LDL-induced Stat1 phosphorylation and its binding to CD36 promoter was significantly attenuated while LXRα expression and its binding to the ABCA1/ABCG1 locus, NFATc2 activation and its binding to ABCA1 locus was enhanced. The present study thus demonstrates that IRAK regulates lipid accumulation by modulating CD36-mediated uptake and ABCA1-, ABCG1-dependent cholesterol efflux. Therefore, IRAK1 can be a



potential target for preventing macrophage foam cell formation. **(Bioessays. 2016 Jul;38(7):591-604).**

4.1.3 Coagulin-L ameliorates TLR4 induced oxidative damage and immune response by regulating mitochondria and NOX-derived ROS.

Withanolides possess diverse biological and pharmacological activity but their immunomodulatory function is less realized. Hence, coagulin-L, a withanolide isolated from Withania coagulans Dunal has been studied for such an effect in human and murine cells, and mice model. Coagulin-L (1, 3, 10 μM) exhibited immunomodulatory effect by suppressing TLR4 induced immune mediators such as cytokines (GMCSF, IFNα, IFNγ, IL-1α, IL-1Rα, IL-1β, IL-2, IL-2R, IL-4, IL-5, IL-6, IL-7, IL-10, IL-12 (p40/p70), IL-13, IL-15, IL-17), chemokines (IL-8/CXCL8, MIG/CXCL9, IP-10/CXCL10, KC, MCP-1/CCL2, MIP-1α/CCL3, MIP-1β/CCL4, RANTES/CCL5, eotaxin/CCL11), growth factors (FGF-basic, VEGF), nitric oxide and intracellular superoxide. Mechanistically, coagulin-L abrogated LPS induced total and mitochondrial ROS generation, NOX2, NOX4 mRNA expression, IRAK and MAPK (p38, JNK, ERK) activation. Coagulin-L also attenuated IκBα degradation, which prevented NFκB downstream iNOS expression and pro-inflammatory cytokine release. Furthermore, coagulin-L (10, 25, 50mg/kg, p.o.), undermined the LPS (10mg/kg, i.p.) induced endotoxemia response in mice as evinced from diminished cytokine release, nitric oxide, aortic p38 MAPK activation and endothelial tissue impairment besides suppressing NOX2 and NOX4 expression in liver and



aorta. Moreover, coagulin-L also alleviated the ROS mediated oxidative damage which was assessed through protein carbonyl, lipid hydroperoxide, 8-isoprostane and 8-hydroxy-2-deoxyguanosine quantification. To extend, coagulin-L also suppressed carrageenan-induced paw edema and thioglycollate-induced peritonitis in mice. Therefore, coagulin-L can be of therapeutic importance in pathological conditions induced by oxidative damage. **(ToxicolAppl Pharmacol. 2016 Oct 15;309:87-100)**

4.1.4 Endothelial microparticles encompass active and functional mitochondria activating endothelium during inflammation

Endothelial microparticles (EMP) are complex vascular structures released from activated endothelial cells under various pathological conditions. In this study, the presence of complete and functional mitochondria in EMP was identified and established. The presence of mitochondria in EMP was traced through FACS and confocal microscopy by staining EMPs with mitotraker. Further, to confirm the presence of whole intact mitochondria, the four complexes of electron transport chain;NADH-DH (complex I), SDHA (complex II), cytochrome c (complex III) and cytochrome c oxidase (complex IV) were checked through western blot and all were found to be present in EMPs. Then it was found that theEMP mitochondria was functionally active through studying different parameters of mitochondrial activity such as ATP synthase assay, JC-1 dye (membrane potential), and oxygen consumption rate (OCR, mitochondrial respiration). Further, tried to relate the function of mitochondria in EMP by making its mitochondria dysfunctional by generating EMPs from cells treated with oligomycin and LPS.These EMP containing dysfunctional mitochondria were then transferred to naïve cells and were observed to activate the endothelium as seen through enhanced monocyte attachment, increased EMP adhesion in $FeCl_3$ induced carotid artery mouse model as observed through intravitalmicroscopy. Dysfunctional mitochondria present in EMP increases the ROS content of the target cells thereby activating NF-κB pathway which further increases the inflammatory mediators such as e-selectin, ICAM1 and IL-1β and TNF-

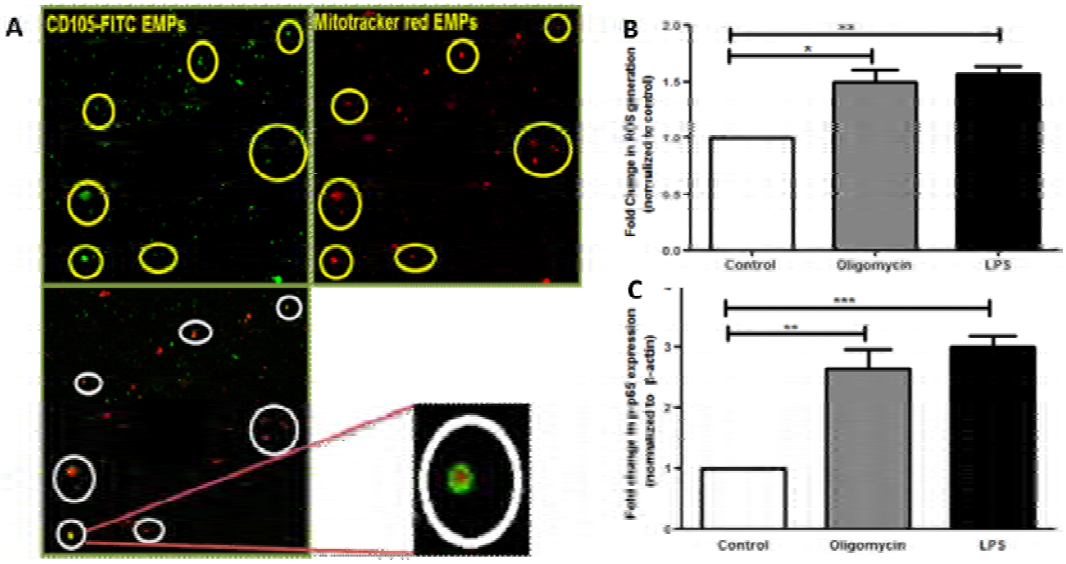


Figure: A. Confocal image of EMP containing mitochondria; B. ROS content of the target cell on treatment with EMP; C. p-p65 expression of the target cell on treatment with EMP.

α production causes.From this study, it is concluded that EMP encloses active and totally functional mitochondria, which during inflammation may become dysfunctional and can activate the endothelium.

4.1.5 Nitric oxide-mediated apoptosis of neutrophils through caspase-8 and caspase-3 dependent mechanism.

Neutrophils play an indispensable role in killing of invading pathogens by enhancing reactive oxygen species (ROS) and NO generation, and subsequently undergoing apoptosis. Unlike ROS/NOX2, role of NO/NOS still remains undefined in the apoptosis of neutrophils (PMNs) and the present study attempts to decipher the importance of NO/ NOS in the neutrophil apoptosis. Prolonged treatment of human PMNs or mice bone marrow derived neutrophils (BMDN) with NO led to enhanced ROS generation, caspase-8/ caspase-3 cleavage, reduced mitochondrial membrane potential and finally cellular apoptosis. NO-induced ROS generation led to caspase-8 deglutathionylation and activation, which subsequently activated mitochondrial death pathway via BID (Bcl-2 family protein) cleavage. NO-mediated augmentation of caspase-8 and BID cleavage was significantly prevented in BMDN from neutrophil cytosolic factor-1 (NCF-1) knockout (KO) mice, implying the involvement of NOX2 in NO-induced apoptosis of PMNs. Furthermore, ROS, NO generation and inducible nitric oxide synthase (iNOS) expression were enhanced in a time-dependent manner in human PMNs and mice BMDN undergoing spontaneous apoptosis. Pharmacological and genetic ablation of iNOS in human PMNs and mice BMDN significantly reduced the levels of apoptosis. Impaired apoptosis of BMDN from iNOS KO mice was due to reduced caspase-8 activity which subsequently prevented caspase-3 and -9 activation. Altogether, results suggest a crucial role of NO/ iNOS in neutrophil apoptosis via enhanced ROS generation and caspase-8 mediated activation of mitochondrial death pathway. **(Cell Death and Disease (2016) 7, e2348;doi: 10.1038/cddis.2016.248)**

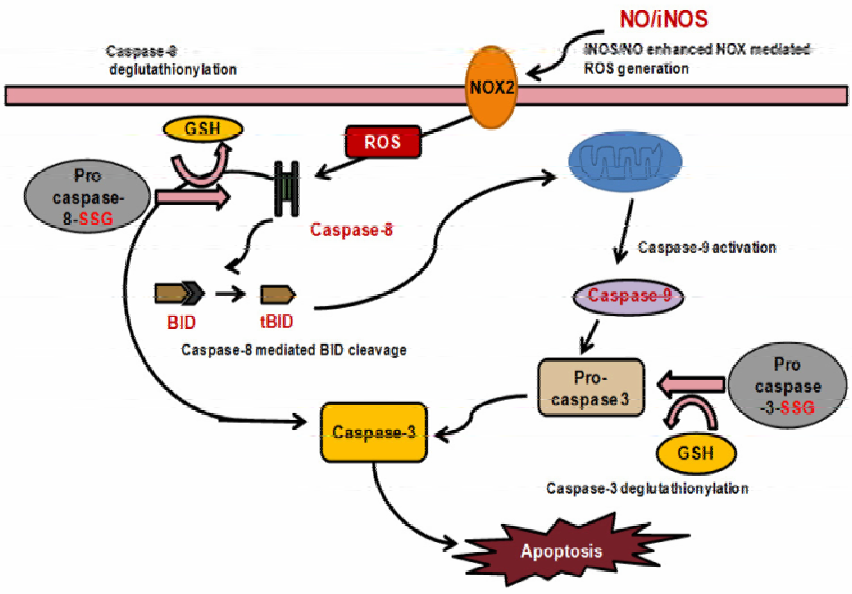


Figure : Schematic representation of molecular mechanism involved in NO induced neutrophil apoptosis

4.1.6 High oxidative stress adversely affects NFkB mediated induction of inducible nitric oxide synthase in human neutrophils: Implications in chronic myeloid leukemia

Increasing evidence support bimodal action of nitric oxide (NO) both as a promoter and as an impeder of oxygen free radicals in neutrophils (PMNs), however impact of high oxidative stress on NO generation is less explored. In the present study, comprehensively investigated the effect of high oxidative stress on inducible nitric oxide synthase (iNOS) expression and NO generation in human PMNs. Findings suggest that PMA or diamide induced oxidative stress in PMNs from healthy volunteers, and high endogenous ROS in PMNs of chronic myeloid leukemia (CML) patients attenuate basal as well as LPS/ cytokines induced NO generation and iNOS expression in human PMNs. Mechanistically, it was found that under high oxidative stress condition, S-glutathionylation of NFkB (p50 and p65 subunits) severely limits iNOS expression due to its reduced binding to iNOS promoter, which was reversed in presence of DTT. Furthermore, by using pharmacological inhibitors, scavengers and molecular approaches, identified that enhanced ROS generation via NOX2 and mitochondria, reduced Grx1/2 expression and GSH level associated with NFkB S-glutathionylation in PMNs from CML patients. Altogether data obtained suggest that oxidative status act as an important regulator of NO generation/iNOS expression, and under enhanced oxidative stress condition, NOX2-mtROS-NFkB S-glutathionylation is a feed forward loop, which attenuate NO generation and iNOS expression in human PMNs. **(Nitric Oxide 58 (2016) 28-41)**

4.1.7 Altered glucose and lipid homeostasis in liver and adipose tissue pre-dispose inducible NOS knockout mice to insulin resistance

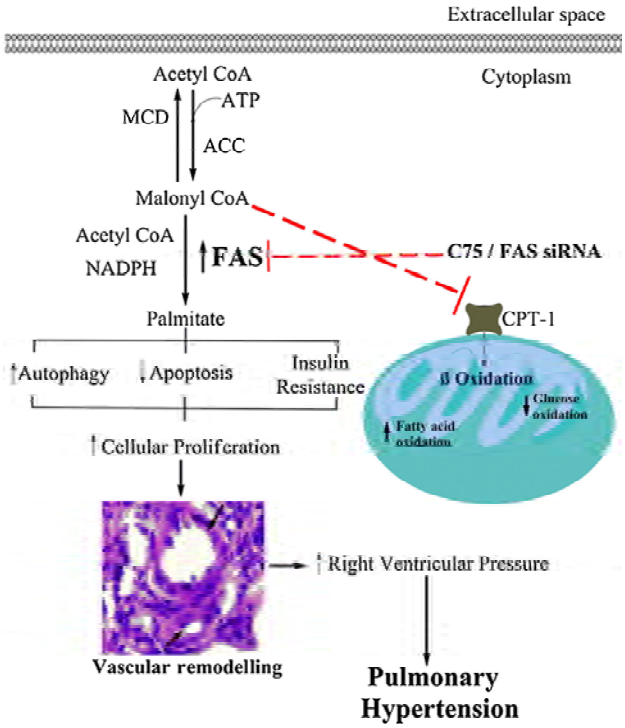
On the basis of diet induced obesity and KO mice models, nitric oxide is implied to play an important role in the initiation of dyslipidemia induced insulin resistance. However, outcomes using iNOS KO mice have so far remained inconclusive. The present study aimed to assess IR in iNOS KO mice after 5 weeks of LFD feeding by monitoring body composition, energy homeostasis, insulin sensitivity/signaling, nitrite content and gene expressions changes in the tissues. It was found that body weight and fat content in KO mice were significantly higher while the respiratory exchange ratio (RER), volume of carbon dioxide (VCO2), and heat production were lower as compared to WT mice. Furthermore, altered systemic glucose tolerance, tissue insulin signaling, hepatic gluconeogenesis, augmented hepatic lipids, adiposity, as well as gene expression regulating lipid synthesis, catabolism and efflux were evident in iNOS KO mice. Significant reduction in eNOS and nNOS gene expression, hepatic and adipose tissue nitrite content, circulatory nitrite was also observed. Oxygen consumption rate of mitochondrial respiration has remained unaltered in KO mice as measured using extracellular flux analyzer. Findings establish a link between the NO status with systemic and tissue specific IR in iNOS KO mice at 5 weeks. **(Scientific Reports. (In press).**

4.1.8 Inhibition of fatty acid Synthase (FAS) is protective in pulmonary hypertension

Pulmonary hypertension (PH) is a fatal disease afflicting persons at the high altitude and patients of chronic obstructive pulmonary disease. In PH, there is extensive pulmonary vascular remodelling and right ventricular hypertrophy. In PH, similar to cancer, there is altered energy metabolism, apoptosis resistance and cellular proliferation in pulmonary vasculature. Proliferating cells exhibit higher rate of *de novo* fatty acid synthesis to provide lipids for membrane formation and energy production. Inhibition of *de novo* fatty acid synthesis has been found protective in cancer experimentally, therefore, it was hypothesized that modulation of *de novo* fatty acid synthesis by inhibition of fatty acid synthase (FAS) would prove beneficial for PH.

Human pulmonary artery smooth muscle cells (HPASMCs) were exposed to hypoxia and to induce PH *in vivo*, rats were treated with monocrotaline (MCT). FAS was inhibited by siRNA (60 nM) and intraperitoneal administration of pharmacological inhibitor C75 (2 mg/ kg, once a week for 5 weeks) in *in vitro* and *in vivo* studies respectively.

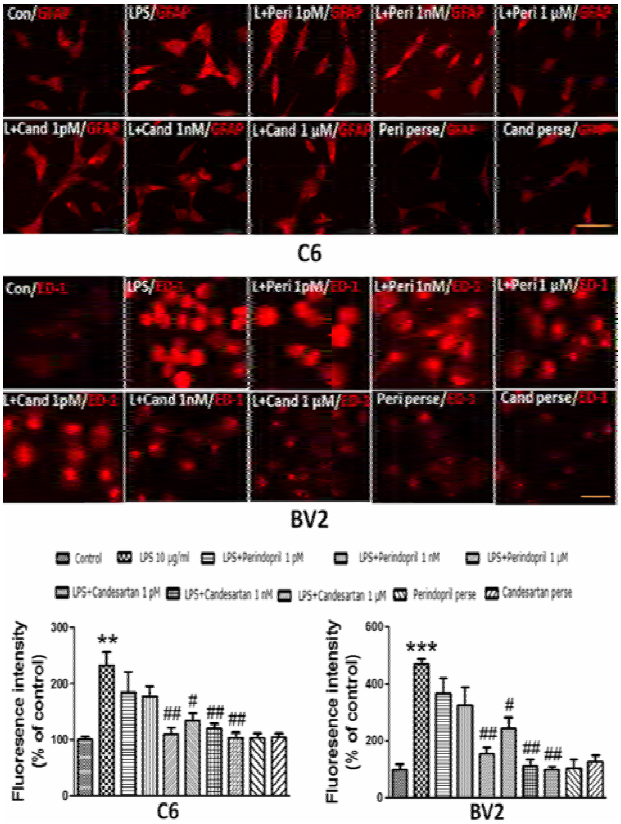
Increased expression and activity of FAS were observed in hypoxic HPASMCs and lungs of MCT-treated rats. Inhibition of FAS increased apoptosis and glucose oxidation, but decreased proliferation and markers of



autophagy, glycolysis and insulin resistance in hypoxic HPASMCs. It also improved the mitochondrial functions as evident by increased level of ATP and restoration of normal level of ROS and membrane potential of mitochondria. In MCT-treated rats, FAS inhibition decreased right ventricular pressure, hypertrophy, pulmonary vascular remodelling (increased apoptosis and decreased proliferation of cells) and endothelial dysfunction in lungs. Results demonstrate that FAS activity is modulated in PH, and its inhibition may provide a new therapeutic approach to treat PH. **(British Journal of Pharmacol. 2016 Jun; 173(12):2030-45).**

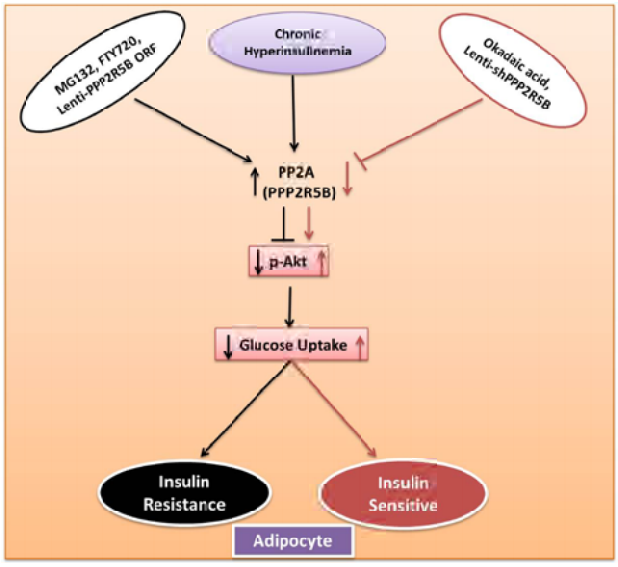
4.1.9 Angiotensin receptor blockade modulates NFκB and STAT3 signalling and inhibits glial activation and neuroinflammation better than angiotensin-converting enzyme inhibition

Various clinical reports showed better neuroprotection by AT1 receptor blockade (ARB) than angiotensin-converting enzyme inhibition (ACEi), but experimental evidences and associated mechanism for this observation are lacking. Therefore, investigated the effect of ARB, using Candesartan, and ACEi, using Perindopril, in equimolar concentrations in astroglial (C6) and microglial (BV2) cells employing lipopolysaccharide (LPS) to induce neuroinflammation. Further, Candesartan (0.1mg/kg) and Perindopril (0.1mg/kg) were orally administered in male SD rats for five consecutive days, and on the fifth day, rats were challenged with LPS (i.p.; 250 µg/kg) and sacrificed after 24 h. LPS-induced neuroinflammation (increased astroglial and microglial activation, IκBα degradation, NFκB nuclear translocation, STAT3 activation, and TNF-α release) was more efficiently prevented by Candesartan (even at lower concentration of 1 nM) than by Perindopril (1 µM) in both the cell types and in rat model of neuroinflammation. In addition, increased AT1 receptor (AT1R) and decreased AT2 receptor (AT2R) expression was observed in LPS-induced neuroinflammation in both *in vitro* and *in vivo* studies. Candesartan, as compared to Perindopril, increased the expression of AT2R in both the experimental conditions. Interestingly, concomitant blockade of AT2R by PD123319 significantly reversed the beneficial effects of Candesartan in both the cell types and in rat model of neuroinflammation. Finally, data emphasize that superiority of Candesartan as compared to Perindopril is due to better activation of AT2R which results in PP2A activation, IκBα stabilization, and suppression of NFκB and STAT3 inflammatory signalling. **(MolNeurobiol. 2016 Dec; 53(10):6950-6967).**



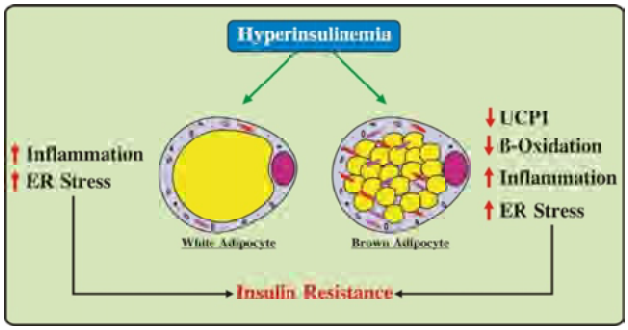
4.1.10 PPP2R5B, a regulatory subunit of PP2A, contributes to adipocyte insulin resistance

Chronic exposure of insulin to the tissues (i.e. hyperinsulinemia) contributes to the impairment of insulin signaling pathway, thus causing insulin resistance. Phosphorylation and dephosphorylation events in insulin signaling pathway play an essential role in signal transduction and glucose uptake. Amongst all, Akt protein is considered as a nodal protein of overall insulin signaling, activation of which is responsible for triggering GLUT4 translocation and glucose transport. Various phosphatases such as PTEN, PP2A have been reported to be involved in dephosphorylation and inactivation of Akt protein. The present study identified increased activity of PP2A followed by increased PP2A-B subunit expression in chronic hyperinsulinemia treated adipocyte along with insulin resistant phenotype. This increased phosphatase activity leads to activation of cAMP/PKA axis, which in turn increased cAMP levels in insulin resistant (IR) adipocytes. Okadaic acid, an inhibitor of PP2A restored and increased insulin stimulated glucose uptake in insulin resistant (IR) and insulin sensitive (IS) adipocytes respectively. Chemical activation of PP2A through MG132 and FTY720 in IS adipocytes showed decreased insulin sensitivity corroborated with decreased Akt phosphorylation. Herein also found PPP2R5B, a regulatory subunit of PP2A is responsible for the dephosphorylation and inactivation of Akt protein. Increased expression of PPP2R5B was also confirmed in white adipose tissue of high fat diet induced IR mice model. Overexpression and suppression strategies confirmed the role of PPP2R5B in regulating insulin signaling. Thus, it is concluded that PPP2R5B, a B subunit of PP2A is a negative regulator of Akt phosphorylation contributing partly to the chronic hyperinsulinemia induced insulin resistance in adipocytes. **(Molecular and Cellular Endocrinology, 2016, 5;437:97-107)**



4.1.11 Chronic hyperinsulinemia reduces insulin sensitivity and metabolic functions of brown adipocytes

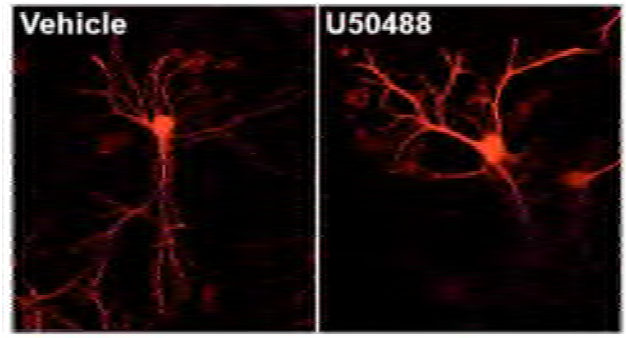
The growing pandemics of diabetes have become a real threat to world economy. Hyperinsulinemia and insulin resistance are closely associated with the pathophysiology of Type 2 diabetes. In pretext of brown adipocytes being considered as the therapeutic strategy for the treatment of obesity and insulin resistance, it has been tried to understand the effect of hyperinsulinemia on brown adipocytes function. For the first time, herein reported that hyperinsulinemia induced insulin resistance in brown adipocyte is also accompanied with the loss of brown adipocyte characteristics. White and brown adipocytes differentiated from human mesenchymal stem cell show insulin resistant phenotype on chronic insulin (CI) treatment. CI treatment decreased expression of brown adipocyte specific markers such as PRDM16, PGC1α and UCP1 at both mRNA and protein level. JCI and TMRE staining showed decrease in mitochondrial population as well as activity in CI treated adipocytes. In the study, also analysed the change in metabolic activity following CI treatment using extra cellular flux analyser. We noted drastic decrease in oxygen consumption rate (OCR) and spare respiratory capacity on CI treatment. Morphological study indicates increased accumulation of lipid droplets in CI treated brown adipocytes. We have further validated these *in vitro* results in C57BL/6 mice implanted with mini-osmotic insulin pump for 8 weeks.

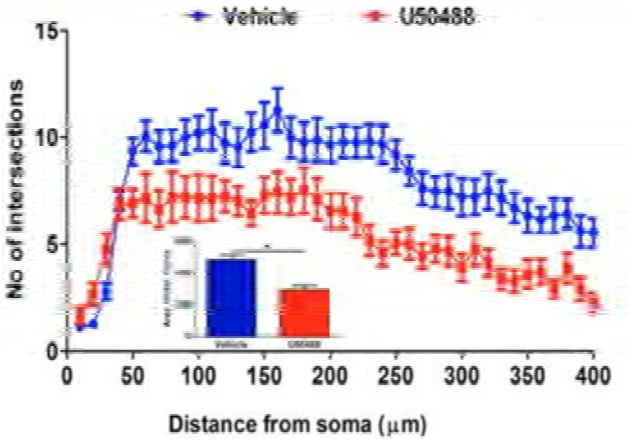


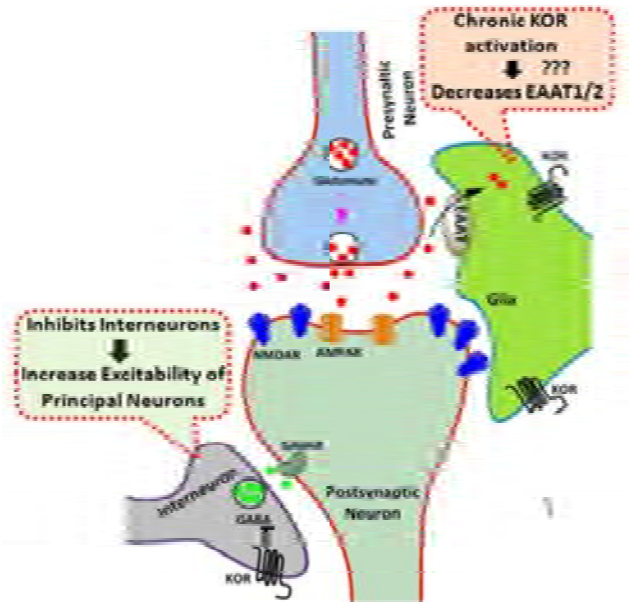
The above results conclude that hyperinsulinemia have deleterious effect on brown adipocyte function, making it susceptible to insulin resistance. Thus above findings have greater implication in designing approaches for the treatment of insulin resistance and diabetes via recruitment of brown adipocytes. **(Journal of Endocrinology. 230(3): 275-90).**

4.1.12 Crosstalk between Kappa opioid receptor (KOR) and NMDA: Implication in treatment resistant depression

Psychotomimetic and prodepressive effect by kappa opioid receptor activation in rodents and human is







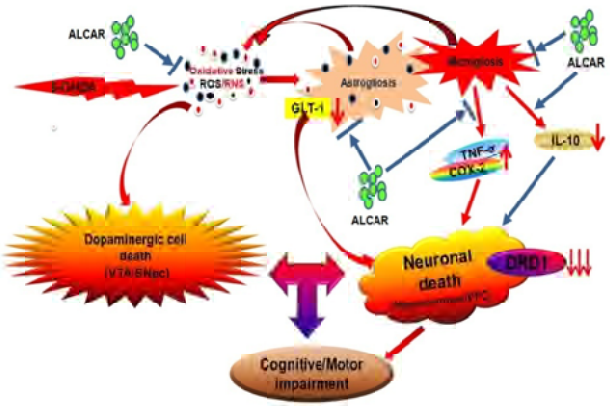
widely known. Interestingly, recent clinical investigations have shown the salutary effects of KOR antagonists in treatment resistant depression. This study was undertaken to reveal the molecular determinant of KOR mediated depression and antidepressant response of KOR antagonist. It was observed that chronic KOR activation by U50488, a selective KOR agonist, significantly increased depression like symptoms (behavioral despair, anhedonia and sociability) in C57BL/6J mice, which were blocked by KOR antagonist norBNI and antidepressant imipramine, but not by fluoxetine and citalopram. Quite interestingly, chronic KOR activation increased phosphorylation of NR2B subunit of NMDA at tyrosine 1472 (pNR2B NMDA) in the hippocampus, but not in the cortex. This NR2B phosphorylation was blocked by norBNI and imipramine, but not by fluoxetine and citalopram. Furthermore, depression like behaviors induced by KOR activation was reversed by NR2B selective inhibitor Ro 25-6981. Notably, U50488 induced phosphorylation of NR2B was blocked by inhibitor of Src kinases (PP2) in the primary neurons, revealing the molecular mechanism of cross talk between KOR and NMDA. Also, it was observed that chronic stimulation of primary cortical as well as hippocampal neurons lead to significant decrease in expression of neuroptrophin BDNF and neuronal arborisation, a widely reported phenotypic and biochemical correlates of depressive disorders. These results suggest “KOR induced pNR2B NMDA” as a molecular determinant of treatment resistant depression **(Sci Rep.2016 Sep 16;6:33401).**

4.1.13 Altered glucose transport, connexin expression and endoplasmic reticulum stress in streptozotocin treated neuronal and astrocytes cells: implications in Alzheimer’s disease

The investigation was undertaken to explore the cell type specific mechanistic aspects in streptozotocin (STZ) induced Alzheimer’s like pathology. The neuronal and astrocyte cells were treated with STZ at 10, 50, 100 and 1000ìM concentration for 48 h. STZ treatment caused significant decrease in cell viability and increased cytotoxicity of N2A and C6 cells involving astrocytes activation. STZ treatment also disrupted the energy metabolism by altered glucose uptake and its transport in both cells as reflected with decreased expression of glucose transporters (GLUT1/3). The consequent decrease in ATP level and decreased mitochondrial membrane potential was also observed in both the cells. STZ caused increased intracellular calcium which could cause the initiation of endoplasmic reticulum (ER) stress. With this view the ER stress related markers GRP78, GADD153 and caspase-12 were estimated in both cells. Significant upregulation of ER stress related markers was observed in both cells after STZ treatment. The cellular communication of astrocytes and neurons was also altered as reflected by increased expression of connexin 43. STZ induced apoptotic death was asserted by elevated expression of caspase-3 and PI/Hoechst staining and DNA fragmentation in cells. In conclusion, study showed that STZ exert alike biochemical alterations, ER stress and cellular apoptosis in both neuronal and astrocyte cells

4.1.14 Acetyl-L-carnitine (ALCAR) mediated improvement of cognitive/motor deficits and neuroprotective effect animal model of Parkinson’s Disease

Parkinson’s disease is accompanied by non motor symptoms including cognitive impairment, which precede the onset of motor symptoms in patients and are regulated by dopamine (DA) receptors and mesocorticolimbic pathway. The relative contribution of DA receptors and astrocytic glutamate transporter (GLT-1) in cognitive functions is largely unexplored. Similarly, whether microglia derived increased immune response affects cognitive functions and neuronal survival is not yet understood. The present study investigated the effect of Acetyl-L-carnitine (ALCAR) on cognitive functions and its possible underlying mechanism of action in 6-hydroxydopamine (6-OHDA) induced hemiparkinsonian rats. ALCAR treatment in 6-OHDA lesioned rats improved memory functions as confirmed by decreased latency time and path length in the Morris water maze test. ALCAR further enhanced D1 receptor levels without altering D2 receptor levels in the hippocampus and prefrontal cortex (PFC) regions, suggesting that D1 receptor is preferentially involved in the regulation of cognitive functions. ALCAR attenuated microglial activation and release of inflammatory mediators through balancing pro-inflammatory and anti-inflammatory cytokines, which subsequently enhanced the survival of mature neurons in the CA1, CA3 and PFC regions and improved cognitive functions in hemiparkinsonian rats. ALCAR treatment also improved GSH content, while decreasing oxidative stress indices, iNOS levels and astrogliosis resulting in up-regulation of GLT-1 levels. Additionally, ALCAR prevented the loss of DAergic neurons in VTA/SNpc regions of 6-OHDA lesioned rats, thus maintaining the integrity of nigrostriatal pathway. Together, these results demonstrate that ALCAR treatment in hemiparkinsonian rats ameliorates neurodegeneration and cognitive



deficits, hence suggesting its therapeutic potential in neurodegenerative diseases (**MolNeurobiol. 2016**).

4.1.15 Understanding mechanistic aspects of Alzheimer's disease: Putative IDE, C28F5.4 (ceIDE-1) identified from *C. Elegans*

Insulin-degrading enzyme (IDE) is a zinc metalloprotease, known to degrade insulin peptide and amyloid-beta (Aβ); the key protein involved in Alzheimer's disease (AD). Considering the important role played by IDE in disease progression of AD and type 2 diabetes mellitus (T2DM), endeavored to identify the *Caenorhabditis elegans* (*C. elegans*) IDE orthologous genes and test them for their role in AD related outcomes. In the study, employed bioinformatics, reverse genetics and molecular biology approaches towards identification and functional characterization of putative IDE candidates in *C. elegans*. Using *in-silico* analysis, identified seven *C. elegans* genes that possess HXXEH motif, an identifying marker of IDE. Further carried out functional analysis of the identified genes in Aβ expressing *C. elegans* strain CL4176 [myo-3/Aβ1-42 long 3'-UTR] via studying effect on Aβ induced toxicity, cholinergic neuroanatomy, content of acetylcholine/acetylcholine-esterase, extent of reactive oxygen species and expression of FOXO transcription factor DAF-16. Findings reveal that amongst the identified putative IDE orthologs, a functionally uncharacterized gene C28F5.4 had a profound effect on the tested endpoints. Knocking down C28F5.4 modulated the AD associated conditions by decreasing Aβ induced toxicity, severely compromising cholinergic neuroanatomy, reducing expression of acetylcholine-transporter, decreasing acetylcholine content, elevating ROS, with no effect on DAF-16 stress-response protein. These studies provide crucial insight into the structural/functional orthology of IDEs across human and nematode species and further understanding of the involvement of these proteins and insulin pathway in AD. Further studies could aid in identifying novel drug-targets and in understanding the common modulating factors between AD and T2DM. **(*Biochem Biophys Acta.* 2016 Nov;1860(11 Pt A):2454-62)**

4.2 New Models

4.2.1 Real time thrombus analysis using Intravital microscopy:

A set-up for real time thrombus analysis using Intravital microscopy was developed in mice mesenteric artery in $FeCl_3$ induced thrombosis model. This technique provides time kinetics of platelet clot/thrombus formation and will be utilize to test novel and potential anti-thrombotic compund at CDRI.

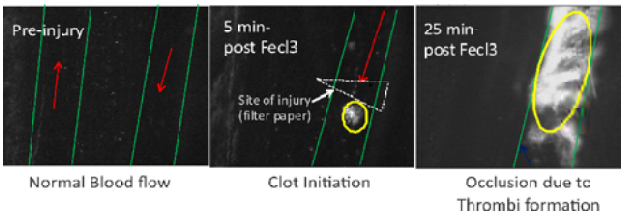


Figure. one mm filter paper soaked in 5% $FeCl_3$ solution was applied on the mesenteric artery of anesthesized mice. Live imaging of thromus formation was monitored with the help of labeled platelets using Olympus EMCCD microscope camera.

CANCER AND RELATED AREAS

Area Coordinators: Dr Arun Kumar Trivedi & Dr Smrati Bhadauria

5

Cancer research area, initiated recently at CSIR-CDRI, focuses to understand cancer pathogenesis (Particularly Breast, Cervical, Oral, Colorectal and leukemia) with primary objective of identifying biomarkers and targets for better diagnosis, prognosis and efficacious cancer therapeutics that include following major objectives:

- Investigating molecular mechanisms underlying cancer invasion and metastasis (Identification of novel targets)
- Evaluating anticancer activity of in-house/commercial compounds and their role in sensitizing resistant cancer towards existing therapy (Preclinical drug discovery)
- Identification /Validation of Diagnostic & Prognostic Markers

5.1 Investigating molecular mechanisms underlying cancer invasion and metastasis

5.2 Evaluating anticancer activity of in-house/commercial compounds and their role in sensitsing resistant cancers towards existing therapy

5.3 Identification of novel diagnostic and prognostic biomarkers

5.4 Novel formulations of anticancer agents

Highlights of advancing the knowledge frontier

Role of E3 Ubiquitin Ligase, Fbw7, in regulating protein turn over and functions of colon specific master transcription factor CDX2

CDX2, Drosophila caudal-related homeobox transcription factor is an intestine specific transcription factor required for intestinal development and differentiation. Expression of CDX2 is confined to the intestinal epithelia in adult mice and humans where it regulates expression of genes involved in differentiation and proliferation. Although, CDX2 degradation by ubiquitin-proteasome pathway has previously been reported, the underlying E3 ubiquitin ligases involved in proteasomal degradation of CDX2 have largely remained unknown. We therefore surmised that differential CDX2 expression observed in colon cancers might be due to deregulation of CDX2 protein turnover by E3 ubiquitin ligases and thus hypothesized that E3 ubiquitin ligase SCF^{Fbw} (hereafter referred as Fbw7) may target CDX2 for ubiquitin-mediated degradation based on the fact that CDX2 contained two putative phosphodegron motifs (CPDs) that may be targeted by Fbw7. Interestingly GSK3β consensus also coincided with these two CPDs. We therefore speculated that active GSK3β could phosphorylate CDX2 in its CPDs to be recognized and degraded by Fbw7.

Fbw7 negatively regulates steady state levels of CDX2: Based on the presence of two putative CPDs in CDX2 protein we investigated if Fbw7 targeted CDX2 for ubiquitin-mediated proteasome degradation. Immunoblotting showed that overexpression of wild type Fbw7 indeed downregulated CDX2 protein levels while ligase dead mutants had no effect. Since over expression of Fbw7 inhibited endogenous CDX2 levels, we next showed that Fbw7 RNAi restored endogenous CDX2 in colon cancer cells. To exclude the possible off-target effects of Fbw7 RNAi, we assessed knock down efficiency of various Fbw7-specific shRNAs as well as siRNAs from different manufacturers. From these validated siRNAs, we used different amounts of siFbw7-1 (Smart pool of three target specific siRNA from Santacruz) to knock down Fbw7 in DLD1 that showed knockdown of Fbw7 substantially enhanced endogenous CDX2 protein levels in DLD1

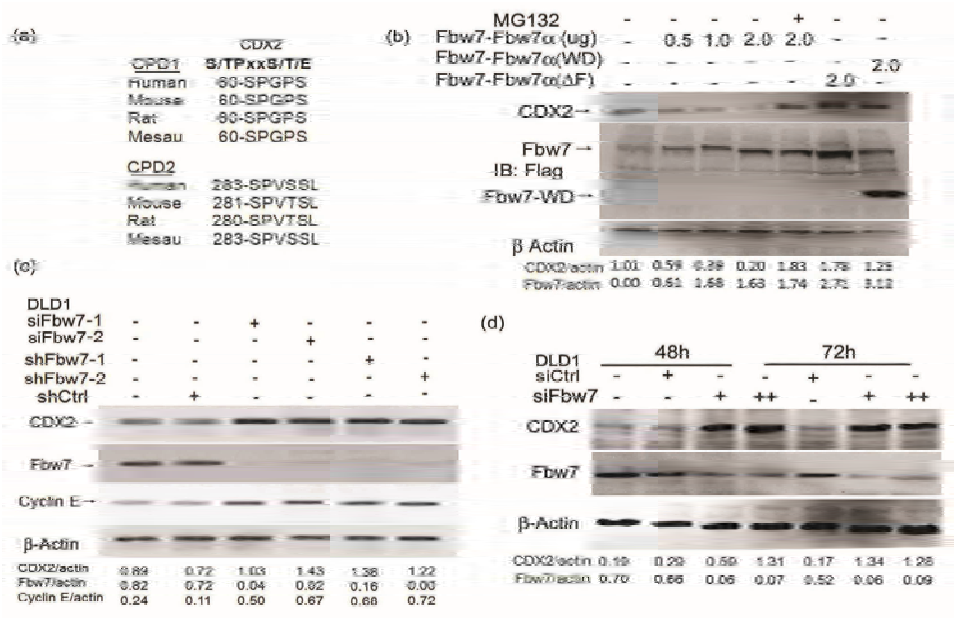


Figure 1 : Fbw7 negatively regulates steady state of CDX2

cells. Taken together, these data demonstrated that Fbw7 inhibited CDX2 expression apparently by promoting its ubiquitin-mediated proteasome degradation (figure 1).

Fbw7-mediated downregulation of CDX2 is GSK3β-dependent: Since prior phosphorylation of substrates within CPD motifs is prerequisite for recognition and subsequent degradation by Fbw7 and because conserved CPDs coincided with GSK3 consensus sequences, we next showed that GSK3β indeed phosphorylated CDX2 and marked it to be targeted by Fbw7-mediated proteasome degradation. Presence of all the three proteins Fbw7, CDX2 and GSK3β in the same inmmunoprotein complex further consolidated our findings (Figure 2).

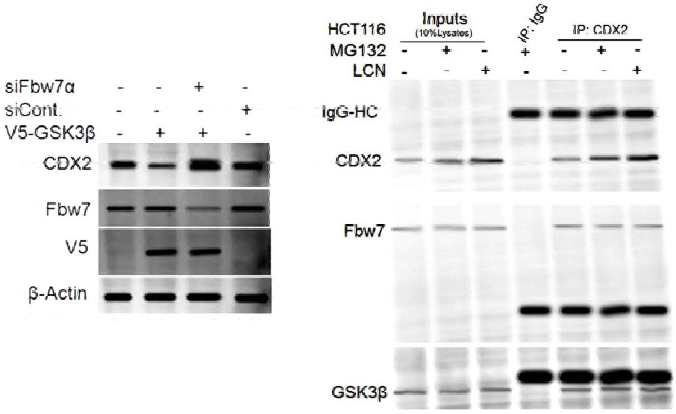


Figure 2: Fbw 7-mediated downregulation of CDX2 is GSK3β dependent

Both the CPDs of CDX2 are involved in GSK3β-dependent ubiquitin-mediated degradation of CDX2 by Fbw7: We next ascertained that GSK3β phosphorylated CDX2 within both the CPDs for its efficient ubiquitin-mediated degradation by Fbw7. We showed that CDX2 point mutants having both CPDs disrupted were resistant to both phosphorylation by GSK3β as well as subsequent ubiquitin-mediated degradation by Fbw7. Our finding further corroborated that Fbw7-mediated regulation of CDX2 protein turnover also mitigated transactivation potential of CDX2 (Figure 3).

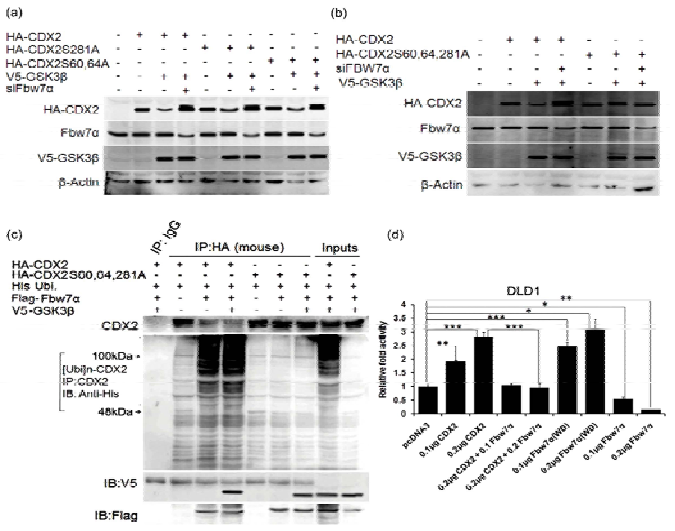


Figure 3: Both the CPDs of CDX2 are involved in GSK3β dependent degradation of CDX2 by Fbw7

Fbw7 inhibition either by RNAi or through its antagonist USP28 restores CDX2 levels and functions. We next showed that inhibition of Fbw7 through RNAi substantially restored colon cell differentiation apparently by restoring CDX2 protein turnover. Further, overexpression of its antagonist deubiquitinase USP28 also inhibited Fbw7 functions by restoring CDX2 thus confirmed that inhibiting Fbw7 either at mRNA through RNAi or at protein levels through USP28 stabilizes its substrate and restores their cellular functions.

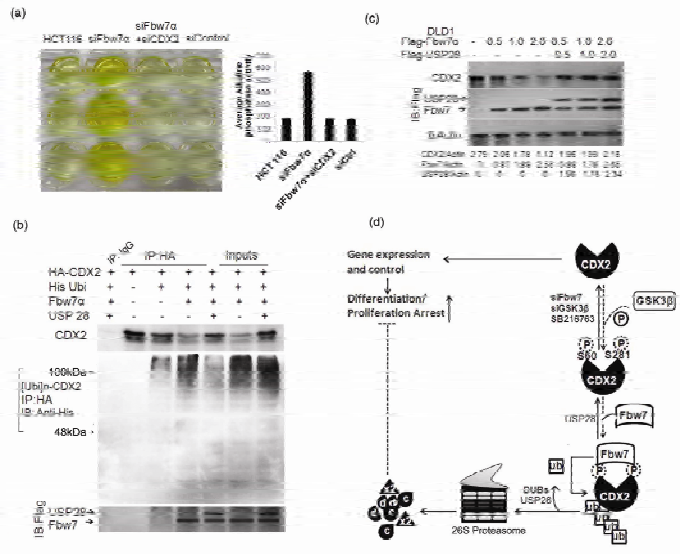


Figure 4: Fbw7 inhibition either by RNAi or through its antagonist USP28 restores CDX2 levels and Functions

Conclusion: Taken together, these findings demonstrated that Fbw7 targeted CDX2 for ubiquitin-mediated proteasome degradation in a GSK3β-dependent manner where GSK3β phosphorylated CDX2 within the two potential CPDs to be recognized by Fbw7. More importantly, like with other substrates of Fbw7 in colon cancer, our finding also demonstrated that CDX2 expression is regulated by Fbw7 in a USP28-dependent manner. Collectively, our data provides detailed molecular insights into the deregulated expression of CDX2 often observed in colon cancers and indicates that therapeutic targeting of Fbw7 in such patients either alone or together with GSK3β may be a possible treatment option for colon cancer.

Kumar et al, Mol Cancer Res. 2016 Nov;14(11):1097-1109.(Featured as research highlight in the November 2016 issue of the journal)

5.1 Investigating molecular mechanisms underlying cancer invasion and metastasis:

5.1.1 Role of MIP-1β dependent upregulation of *MYO3A* gene in macrophage assisted breast cancer metastasis

The dynamic interactions of cancer-cells with tumor-associated-macrophages (TAMs) actively promote invasion-metastasis cascade through intercellular-signalling-networks that need better elucidation. Here it is reported that MIP-1β secreted primarily from macrophages not only enhanced invasive potential of metastatic breast-cancer MDAMB231 cells, but the poorly metastatic MCF-7 cells were also rendered invasive. Furthermore, showed that MIP-1β driven cancer-cell invasion was dependent on upregulated mRNA expression-levels of *MYO3A*-gene, which encodes an unconventional myosin-super-family protein harboring a kinase-domain. *In vivo* studies employing CAM-assay and Syngenic 4T1/BALB/c mice-model corroborated above findings. Additionally, human breast-cancer specimen exhibited significant association between mRNA expression-levels of *MIP-1β*, *MYO3A* and *MMP-9*. This study reveal a possible new function of *MYO3A* during cancer metastasis. Collectively, these results unravel a novel *MIP-1β*/*MYO3A* axis being operational during TAMs-assisted-metastasis, which could serve as potential target for anti-metastasis therapies. ***Baghel et al, Oncoimmunology 2016,***

5.1.2 Deciphering molecular dynamics of 17-β-estradiol (E2) induced Superoxide anion upregulation and resultant mTORC2 activation in breast cancer cells

Augmented ROS levels consequential to functional alteration of key mitochondrial-attributes, contribute to carcinogenesis either directly via oxidative-DNA-damage infliction or indirectly, through activation of oncogenic-signaling-cascades. Previously reported activation of a key oncogenic-signaling-cascade viz. mTOR-signaling-complex-2(mTORC2) due to Estrogen-Receptor(ER) dependent augmentation of $O_2^{\cdot-}$ within mitochondria of 17-β-estradiol(E2) stimulated breast-cancer cells. Deciphering the mechanism underlying above stated $O_2^{\cdot-}$ augmentation is vital for devising novel and efficacious anti-breast-cancer measures. MnSOD is the principle mitochondrial-attribute governing mitochondrial $O_2^{\cdot-}$ homeostasis. Here presented experimental evidence for ER mediated functional alteration of MnSOD activity being instrumental in augmenting mitochondrial O_2-levels in breast-cancer cells. Using reciprocal-immunoprecipitation, demonstrated the physical interaction of ER with MnSOD, which in turn was associated with diminished interaction of MnSOD with SIRT3, a key mitochondrial-deacetylase that deacetylates MnSOD at critical lysine-68(K68) and thereby activates it for scavenging $O_2^{\cdot-}$. Consequent compromised deacetylation of MnSOD at lysine-68(K68) leading to its inhibition and a resultant build-up of $O_2^{\cdot-}$ within mitochondria, culminated in activation of mTORC2. These data unravel a new regulatory role of MnSOD as important control-switch for redox-regulation of ER-signaling cascades. Furthermore, study highlights the importance of targeting ER-MnSOD interaction as a possible strategy for mitigating ER positive breast-cancer progression. ***(Oncogene 2016).***

5.2 Evaluating anticancer activity of in-house/commercial compounds and their role in sensitising resistant cancers towards existing therapy

5.2.1 Dual targeting of MDM2 with a novel small-molecule inhibitor overcomes TRAIL resistance in cancer

Mouse double minute 2 (MDM2) protein functionally inactivates the tumor suppressor p53 in human cancers. Conventional MDM2 inhibitors provide limited clinical application as they interfere only with the MDM2–p53 interaction to release p53 from MDM2 sequestration but do not prevent activated p53 from transcriptionally inducing MDM2 expression. Here, it is reported a rationally synthesized chalcone-based pyrido[b]indole, CPI-7c, as a unique small-molecule inhibitor of MDM2, which not only inhibited MDM2–p53 interaction but also promoted MDM2 degradation. CPI-7c bound to both RING and N-terminal domains of MDM2 to promote its ubiquitin-mediated degradation and p53 stabilization. CPI-7c-induced p53 directly recruited to the promoters of DR4 and DR5 genes and enhanced their expression, resulting in sensitization of TNF-related-apoptosis-inducing ligand (TRAIL)-resistant cancer cells toward TRAIL-induced apoptosis. Collectively, identified CPI-7c as a novel small-molecule inhibitor of MDM2 with a unique two-prong mechanism of action that sensitized TRAIL-resistant cancer cells to apoptosis by modulating the MDM2–p53–DR4/DR5 pathway. ***(Carcinogenesis (2016),*** Published as Editor's Choice Article.

5.2.2 *In vivo* anti-tumor activity of 2-substituted 1-tetralone derived tubulin polymerization inhibitor

A new series of 2-substituted 1-tetralone derivatives were designed and synthesized for targeting tubulins. The basis of designing was derived from structure-activity relationship of combretastatin A4 where the 3,4,5-trimethoxyphenylfragment is an important motif to interact with microtubule. Among these compounds,three leads were found to exhibit potent anti-cancer activity with IC_{50} of 1-3 μM against human breast cancer (MCF-7, MDA-MB-231), rat mammary tumor (LA7), human colon (HCT116), human lung cancer (H1299) cell lines and non-toxic towards non-cancer originated (HEK-293) cell line. All

three compounds significantly stabilized tubulin polymerization and arrested cell cycle progression at G0/G1 phase instead of typical mitotic arrest as high G2/M in case of tubulin polymerization modulators. Mechanistic studies revealed that lead compound induce reactive oxygen species generation and apoptosis in breast cancer cells. Inhibition of ROS by N-acetyl-L-cysteine prevented compound induced cytotoxicity. The lead compound showed potent anticancer activity in LA-7 syngeneic rat mammary tumour model. It was well tolerated up to 1000 mg/kg dose in acute oral toxicity. ***(RSC Adv. 2016 March 24; 6(40): 33369-33379).***

5.2.3 Characterization of new tubulin targeting molecules as an anti-cancer agent

Microtubules are the dynamic cellular structural component that undergo continuous assembly and disassembly. Due to its active participation in the formation of dynamic spindle apparatus during cell division, it has been considered as one of the most effective target for cancer therapeutics.

For the purpose of targeting tubulins more effectively, a new class of gallic acid based glycoconjugates were designed and synthesized using economical and eco-friendly method. Among all the compounds screened, compound S014-011 showed potent anti-cancer activity against breast cancer cells. The latter resulted in tubulin polymerization inhibition and induced G2/M cell cycle arrest, generation of reactive oxygen species, mitochondrial depolarization and subsequent apoptosis in breast cancer cells. In addition, ultraviolet-visible spectroscopy and fluorescence quenching studies of compound with tubulin confirmed direct interaction of compounds with tubulin. S014-011 also exhibited potent *in vivo* anti-tumor activity in LA-7 syngenic rat mammary tumor model. ***(Org Biomol Chem. 2016 Jan 28;14(4):1338-58.63)***

5.2.4 Coumarin-chalcone hybrid activates DNA damage associated signalling pathway to induce apoptosis

Compound S009-131, a coumarin-chalcone hybrid, had been shown to possess anti-proliferative and anti-tumour effect by triggering apoptosis wherewe demonstrated a steady increase in p53 level during S009-131 induced apoptosis in C33A cells. This was further confirmed in HCT-116 cells harbouring wild type p53. Concurrently, the molecule caused an accumulation of HCT116 cells at G2/M phase replicating previous findings on similar effect in C33A and HeLa cells. The strong linkage of these two cellular events with biological consequences of DNA repair pathways raised the possibility that S009-131 might cause DNA damage. Indeed, it was observed g-H2AX specific foci in S009-131 treated HCT116 cells compared to untreated control indicating induction of DNA damage by the molecule. Herein further investigated role of DNA damage signalling pathway in S009-131 induced cancer cell death where it was observed S009-131promoted phosphorylation and activation of ATM and DNA-PK, but not ATR, at earlier time points in order to initiate repair process. S009-131 induced DNA damage response triggered activation of p53 through phosphorylation at its key residues which

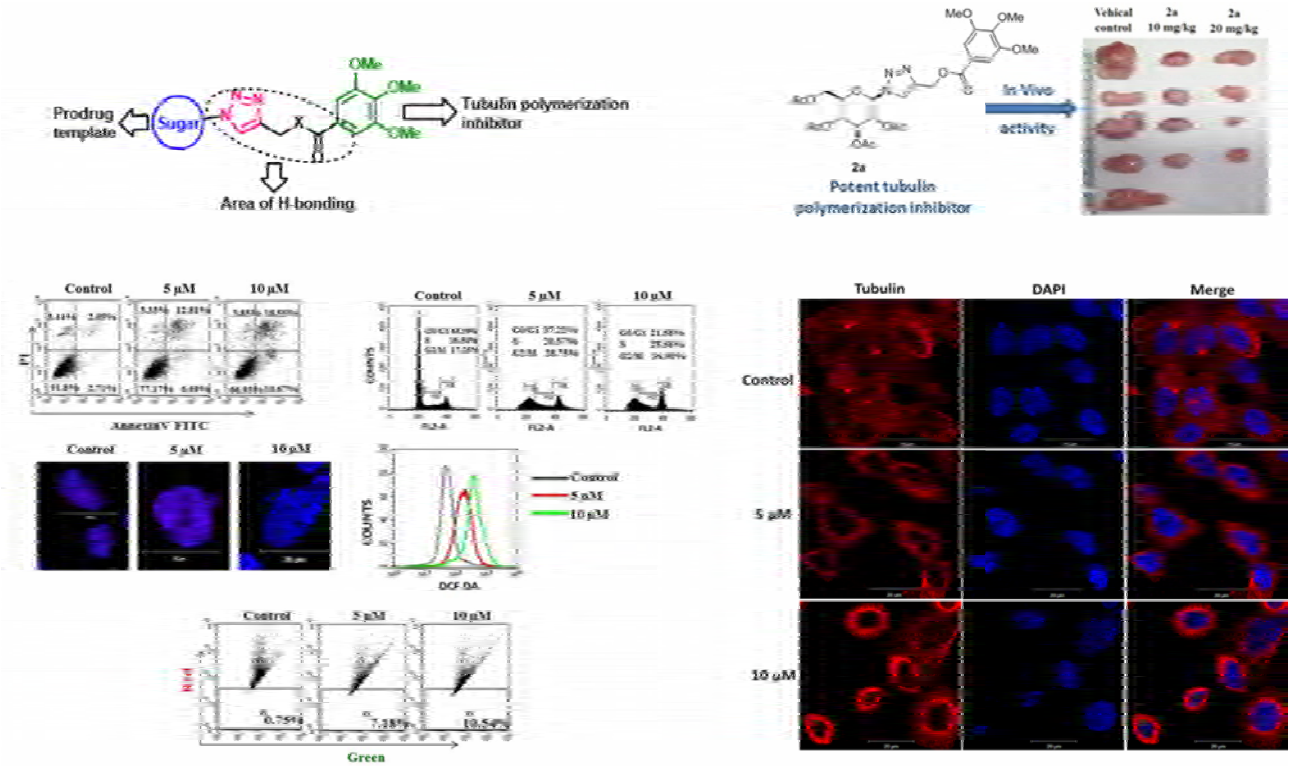


Figure: Anti-cancer activity of new gallic acid derived glycoconjugates based tubulin polymerization inhibitor

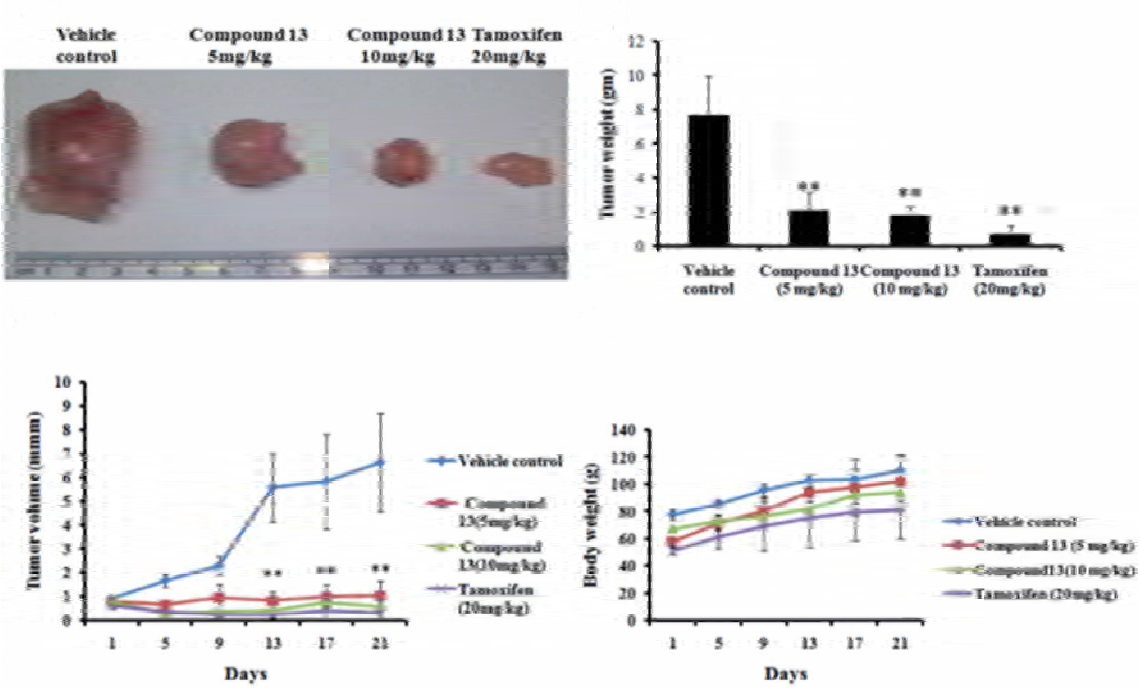


Figure: *In vivo* anti-tumor activity of 2-substituted 1-tetralone derived tubulin polymerization inhibitor

might contribute to its stabilization as well as enhanced transcriptional activity. Pharmacological inhibition of PIKKs abrogated S009-131 induced phosphorylation of p53 at Ser 15. Taken together results suggest that S009-131 activates PIKKs and associated DNA damage response signalling to induce apoptosis in cancer cells.

5.2.5 Therapeutic targeting of the oxidoreductase ERP57 in acute myeloid leukemia

ER-Stress and activation of unfolded protein response belong to the major factors involved in chemoresistance in cancer cells. In this study, investigated the effect of shikonin on the survival of acute myeloid leukemia cells and the role of ER-stress protein ERP57, a protein disulfide isomerase, in improvement of chemotherapy. Using MTT assay we studied cytotoxic effects of shikonin on HL-60 cells. The flow cytometry was adopted to examine the shikonin induced mode of cell death in HL-60 cells. The overall protein expression alteration resulting from shikonin treatment was investigated using proteomics methods. Western blotting was performed to quantify the alteration in protein expression in HL-60 after shikonin treatment. Silencing and overexpression studies were carried out to highlight the therapeutic role of ERP57 in shikonin effect on AML cells. Shikonin induces apoptosis in HL-60 cells without significant effect on Primary cells from healthy volunteers. The apoptotic effect was dose and time dependent and was accompanied by strong alteration in cell proteome. Among the proteins targeted by shikonin, ERP57 was significantly downregulated in HL-60 after treatment. Compared to healthy control ERP57 was found to be highly expressed in AML cell line HL60 and was downregulated after shikonin treatment. Overexpression of ERP57 protected HL-60 from shikonin induced apoptosis, whereas knockdown of ERP57 expression resulted in increase in shikonin induced apoptosis.

Our results demonstrate that ERP57 plays a crucial role in resistance towards shikonin induced apoptosis in AML cells. Targeting of ERP57 might offer a new therapeutic option for the treatment of acute myeloid leukemia. ***(Cell Physiol Biochem 2016)***.

5.2.6 Phosphorylation and functions of the RNA polymerase II CTD in gene regulation

RNA Polymerase II uniquely possesses an extended carboxy terminal domain (CTD) on its largest subunit, Rpb1, comprising a repetitive Tyr1Ser2Pro3Thr4Ser5Pro6Ser7 motif with potential epigenetic modification sites. The phosphorylation of the

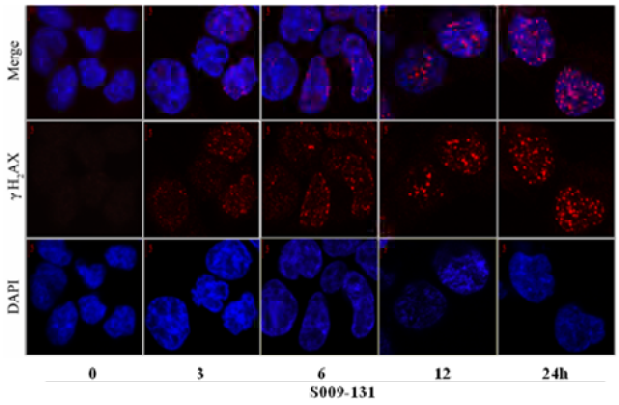


Figure. S009-131 induced DNA damage in HCT116 cells. Representative confocal images showing accumulation of γ-H2AX puncta at different time intervals following S009-131 treatment.

CTD serves as a signal for the binding of various transcriptases and strongly influences functional organization of the nucleus. The specific phosphorylations of CTD affects gene regulation and the transcription coupled CTD phosphorylations patterns have been linked to the human cancer. The observed crosstalk between CTD phosphorylation and chromatin through methyl transferases and BRD4, a prognostic signature for metastatic breast cancer, tempted us to see the gene regulation at the interface involving CTD and chromatin. The physical interaction between the phosphorylated RNA Polymerase II and CTD and capping enzyme is required for the efficient formation of the 5' mRNA cap, the first modification of the nascent mRNA. The 52 capping helps preventing mRNA decay and play a distinct role during the mRNA biogenesis. Recently it was shown that the capping enzyme, RNA guanylyltransferases (Ceg1) has dual specificity and interacts not only with the phosphorylated Ser5 (Ser5P) but also with Ser7P of the CTD. The Ser7 of CTD is essential for the unconditional growth and efficient priming of the mRNA capping complex. The Arg159 and Arg185 of Ceg1 are the key residues that interact with the Ser5P, while the Lys175 with Ser7P of CTD. These interactions appear to be in a specific pattern of Ser5PSer7PSer5P in a tri-heptad CTD (YSPTSPPS YSPTSPSP YSPTSPPS) and provide molecular insights into the Ceg1-CTD interaction for productive mRNA transcription.

5.3 Identification of novel diagnostic and prognostic biomarkers

5.3.1 Characterization of novel diagnostic and prognostic marker for cervical cancer

Our inventions relate to the genes expressed both in normal testis as well as in malignancies (Cancer/ Testis associated genes – CTA) and these proteins have emerged as the most prominent antigen group in the field of tumor diagnostics and treatment. We have indentified and characterized five major CTAs, viz., PP1γ2, CABYR, SAS1B, POTEE and Ecat1; the expression of these antigens have been explored in various cancer cell lines and patient samples. Biopsy tissue samples of various stages of cervical carcinoma have been utilized to validate, PP1ã2 as a cancer biomarker. Its expression was confirmed to be specific only to cancerous tissues, while the normal tissues did not show any signal with respect to the antigen. Analysis of expression of PP1γ2 in pap smear patients revealed that the antigen showed signal even in very early stages of cervical cancer including CIN II stage, confirming its role as a early diagnostic marker for cervical cancer. Interestingly, in cervical cancer patients who were treated with chemotherapy, the signal with respect to PP1γ2 was observed to be very weak and it vanished after completion of radiotherapy treatment, thus confirming its role as a prognostic marker. Presently developing an assay for detection of PP1γ2 in urine samples (a non-invasive assay) and the preliminary data obtained is quite encouraging. In summary, in the present study, demonstrated that PP1ã2 is an excellent novel diagnostic and prognostic marker for cervical cancers.

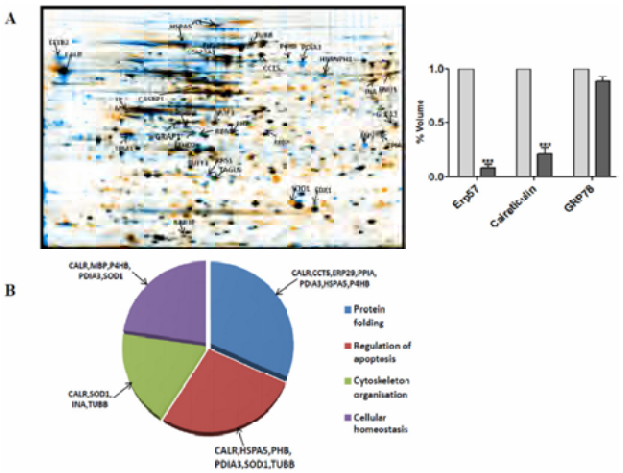


Figure. (A) Shikonin induced change in proteome of HL-60 cells. (B) Classification of differentially expressed proteins upon shikonin treatment according to their biological process.

5.4 Novel formulations of anticancer agents

5.4.1 Parthenolide

Parthenolide, a natural sesquiterpene lactone derived from feverfew (Tanacetum parthenium) was formulated as a liposomal preparation with co-delivery of curcumin with a view to augment its cytotoxicity against breast cancer cells. These preparations are currently being investigated.

5.4.2 Bicalutamide

Self-nanoemulsifying drug delivery systems (SNEDDS) for co-delivery of hesperetin and bicalutamide were fabricated to reduce the dose dependent toxicity of bicalutamide. After 14 days of daily oral administration of drug suspension and drugs loaded SNEDDS in rats at an oral dose of 20 mg/kg, the hepatotoxicity and nephrotoxicity biomarkers were estimated and histopathology was assessed. The pharmacokinetic studies indicated that formulation enhanced bioavailability of both drugs.

In another study the synergistic combination of silibinin and bicalutamide was established and PLGA nanoparticles were prepared for encapsulation of both drugs. It was found that induction of autophagy was responsible for enhanced therapeutic effect. PLGA nanoparticles enhanced oral bioavailability as compared to bicalutamide and silibinin administered to rats as a suspension.

5.4.3 Lapatinib

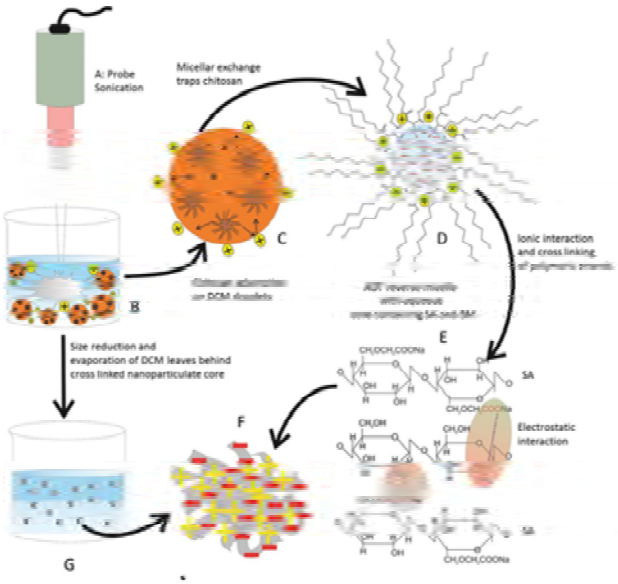
Negatively charged lapatinib nanocrystals coated with hyaluronic acid (HA) were developed for targeting CD44+ cells. The HA coated nanocrystals showed significant enhancement in in vitro studies in MDA-MB-231 cell line as reflected in cytotoxicity, apoptosis, mitochondrial membrane depolarization and induction

of caspases. HA coated nanocrystals reduced systemic toxicity and improved anticancer activity as revealed by in vivo imaging (IVIS).

In another study Lapatinib nanocrystals have been prepared with Vitamin-E TPGS to improve its oral bioavailability and reduce its first pass metabolism. Various in vitro studies demonstrated improved activity of nanocrystals compared with free drug.

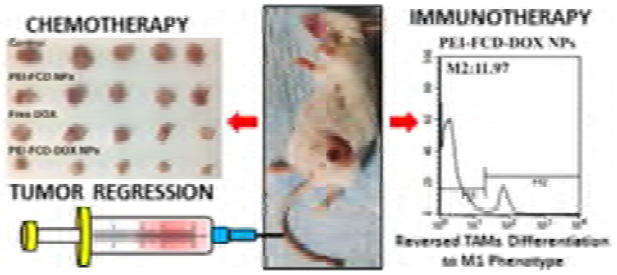
5.4.4 Nanosized complexation assemblies housed inside reverse micelles churn out delivery cores for bendamustine hydrochloride

Bendamustine hydrochloride (BM) is currently used for treatment of different haematological malignancies, especially leukemia. Herein we purport to investigate whether entrapment of BM within a nano-structure could be an approach which might protect this drug from systemic dispositional forces. Nanoparticles were preferred over other colloidal systems due to their amiability towards intravenous administration; however BM's aqueous solubility meant that it was highly improbable to ensure adequate incorporation in mainstream hydrophobic polymers. We therefore preceded by utilizing ionic complexation of hydrophilic natural carbohydrates, sodium alginate (SA) and chitosan (CS) to capture BM. It was anticipated that during the event of ionic cross linking of positively charged CS and negatively charged SA, BM would be strangled by the oppositely charged polysaccharides. Anecdotally tailoring the size of cross linked drug carries has always been difficult. Simplistic addition of chitosan to alginate solution results in formation of visually noticeable macro sized beads. To circumvent this discrepancy a dispersion consisting of specialized reverse micellar structures made of dioctyl sulfo succinate sodium (AOT) was utilized. The reverse micelle can act as a nanoreactor assembly facilitating intramicellar complexation to ensure nanoscopic size of the formed particles (CANPs). Extensive physicochemical characterization viz. particle size analysis, zeta potential measurements, entrapment efficiency, morphological analysis via transmission electron microscopy and drug release studies was done in order to showcase complexation of chitosan and sodium aliginate inside the AOT reverse micelle, and the ability of formed carbohydrate core to protect the drug in bio relevant media.



5.4.5 Electrostatically assembled nanoparticles of doxorubicin for chemoimmunotherapy of breast cancer

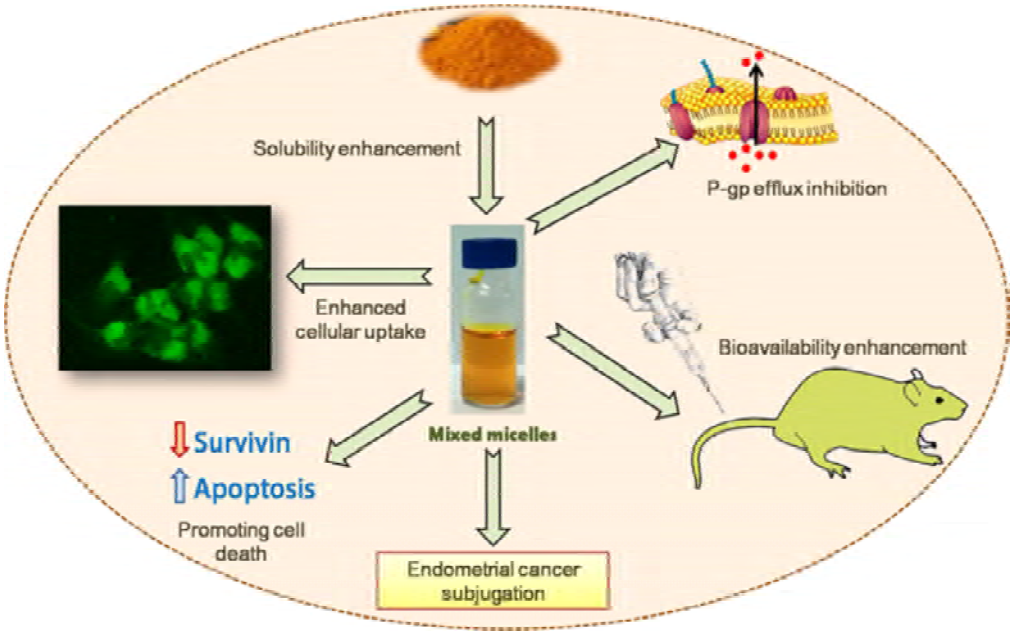
Immunotherapeutic nanoparticles (NPs) could be a viable option for delivering circumstantially effective cytotoxic agents in a manner which suppresses their toxic manifestations. In light of the above hypothesis, doxorubicin (DOX) loaded NPs were prepared using fucoidan (FCD), an immunomodulatory polysaccharide. FCD NPs offered improved cytotoxicity (2.64 folds), cell cycle arrest in G1-S phase (34.65%) and apoptosis (66.12 %) in tumor cells compared to free DOX. The enhancement in apoptosis was due to raised mitochondrial depolarization (88.00 %). In vivo anticancer activity in 4T1 induced tumor bearing BALB/c mice demonstrated a 2.95 folds enhanced efficacy of the NPs after 26 days of treatment. Importantly, NPs treatment generated an immunotherapeutic response indicated by gradual increment of the plasma IL-12 levels and reversed polarization of tumor associated macrophages (TAMs) towards M1 subtype.



Furthermore, pharmacokinetic study suggested that NPs administration in tumor infested mice caused serum DOX levels to vary in a biphasic pattern, with twin peaks occurring at 1 h and 6h which help in maintaining preferential drug localization in tumor. Acute toxicity study exhibited improved safety of DOX when packaged as NPs. Conclusively; developed NPs would be an excellent approach for improved immune-chemotherapy (in terms of efficacy, safety and immunocompetency) against cancer.

5.4.6 Enhanced apoptosis, survivin down-regulation and assisted immunochemotherapy by curcumin loaded amphiphilic mixed micelles for subjugating endometrial cancer

Survivin is up-regulated in 83% of endometrial cancer leading to resistance development. As endometrial tumor advances, it also elicits chronic inflammation characterized by increased cytokine secretion and immune cells infiltration. The present study was designed



to engineer mixed micellar curcumin loaded formulation for investigating survivin down-regulation, its anti-cancer and cytokine modulatory potential against Ishikawa cell lines, an in-vitro model of endometrial cancer. Flory–Huggins interaction parameter (÷ pd) was applied to predict the compatibility between curcumin and surfactant mixture. The developed and characterized formulations were used to comparatively assess hemolysis, cellular uptake, cell-viability, apoptosis, mitochondrial membrane potential loss, rhodamine accumulation and bioavailability. In-vitro cytotoxicity in Vero cells demonstrated no deleterious effects on cell population. We saw better bioavailability, significant rhodamine accumulation, changes in protein expression and modulation in TNF-α, IL-6 and IL-10 levels. In conclusion, developed formulation warrants exploring the therapeutic interventions for overcoming resistance development in endometrial cancer.

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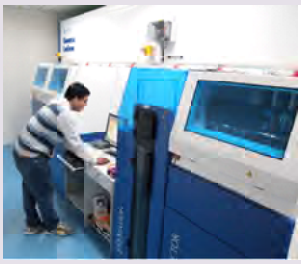



Technical Services and Facilities

1. Business Development & Intellectual Property

a. Business Development activities: The Institute sustained to explore the business development opportunities by establishing liaison with national and international organizations and industries in order to have more public–private partnership at early stage of the development and to have collaborations for new leads. The major new contracts/assignments signed/undertaken by the Institute during reporting period are as follows:

Details	Client/Collaborator	Signing Date
Sponsored Project Agreements		
In vitro Screening of ARP compounds	Advance Research Products, LLC, Paterson, NJ, USA	24.05.2016
Toxicology Study of RISUG implanted in the Uterus of Rats	School of Medical Science and Technology, IIT, Kharagpur	25.05.2016
NMR spectroscopic characterization of INTAS DP	INTAS Pharmaceuticals Limited, Ahmedabad	29.07.2016
Memorandum of Understanding signed for joint R&D		
To study the biological activity (such as anti-tubarcular) of 1,2,3-triazole containing compounds	Department of Chemistry, Dibrugarh University, Dibrugarh, Assam	23.12.2015
Assessment of serum leptin, insulin, HbA1c and blood glucose levels and its correlation with HOMA-IR	Dept of Biochemistry & Dept. of Medicine, King Georges Medical University, Lucknow	30.12.2015
To investigate whether Lipocalin 2 (in mice) NGAL9 (in human) is a part of DNA decoration along with MPO, elastase etc in neutrophil extracellular traps (NETs)	Pennsylvania State University, University Park, USA	03.02.2016
Pharmacokinetic studies of radio protective formulation prepared from active principles isolated from *Podophyllum hexandrum*	Institute of Nuclear Medicine & Allied Sciences, DRDO, Delhi	19.02.2016
Molecular genetic studies on reproductive health disorders like PCOS, endometriosis, miscarriage,Preterm birth and male infertility	Banaras Hindu University, Varanasi	02.03.2016
Suppressive Cytokines Inhibit the Production & function pro-inflammatory cytokines and their Receptor Expression in Human Visceral Leishmaniasis Patients	Dept. of Transplant Immunology & Immunogenetics, AIIMS, New Delhi	04.04.2016
Design and Synthesis of Natural, Un-Natural nalogues of Calothrixins A, B and Evaluation ofantimalarial and anticancer activity	VIT University, School of Advanced Sciences, Vellore	22.04.2016
Evaluation of antiproliferative agents and phytocompounds for their efficacy against human endometrial hyperplasia, human endometrial cancer and stromal differentiation and exploration of mechanism of action thereof	Department of Obstetrics & Gynecology, King Georges Medical University, Lucknow	15.06.2016
For preparing a documentary on various CDRI technologies & five U-tube short video clips in full HD	Amity School of Communication, Amity University, Lucknow	21.06.2016
To promote institutional linkage between CSIR-CDRI and CBMR and to explore other avenues for possible collaboration	CBMR, SGPGIMS Campus, Lucknow	01.07.2016
Development of new anti-Leishmanial agents via structure based drug design targeting *Leishmania* Actin	Institute of Bioinformatics and Applied Biotechnology, Bengaluru	19.07.2016
Collaborative Research Programs in specific fields of mutual interest	IIT, Kanpur	29.07.2016
Development of preclinical and clinical radioprotective formulation prepared by combining Podophyllotoxin and rutin	Institute of Nuclear Medicine & Allied Sciences, (DRDO), Delhi	29.07.2016
Purification of proteins/enzymes from bacteria	G.B. Pant Institute of Himalayan Environment & Development, Almora	26.08.2016
Recombinant protein approach of secretory proteins for clinical validation of pulmonary and extra pulmonary tuberculosis	Department of Pulmonary Medicine, King Georges Medical University, Lucknow	25.10.2016
Advanced Drug Delivery System	CSIR-IICT, Hyderabad and Seth GS Medical College and KEM Hospital, Mumbai	31.10.2016
Preclinical, phase II & III studies for repurposing GLP-1 agonist liraglutide for post-menopausal osteoporosis and sarcopenia treatment	King Georges Medical University, Lucknow	21.11.2016
Preclinical, Phase II & III studies for the repurposing of FDA approved drug CFZ	Homi Bhabha Cancer Hospital & Research Centre, Marripalem, Visakhapatnam (AP)	22.11.2016
To promote institutional linkage between CSIR-CDRI and KGMU and to explore other avenues for possible collaboration	King Georges Medical University, Lucknow	02.01.2017
Memorandum of Agreements		
Profiling and characterization of early phase differential mi- RNA(s) responsible for downstream development of insulin resistance in hMSC derived adipocytes	Department of Biotechnology, New Delhi	18.03.2016
Understanding the role of Poly (ADPribose) polymerase on tight junctions functioning during carcinogenesis	Department of Biotechnology, New Delhi	06.05.2016

Molecular and biochemical characterization of chaperonin class of heat shock proteins of *Leishmania donovani*, their exploration as drug target	Department of Biotechnology, New Delhi	25.05.2016
Studies on the interactions between mycobacteria and host defence peptides	Department of Biotechnology, New Delhi	25.05.2016
Exploration of Interleukin 1 Receptor Associated Kinase (IRAK) family of kinases during macrophage foam cell formation and inflammation	Department of Biotechnology, New Delhi	22.06.2016
Deciphering the roles of secreted proteases in host- *Mycobacterium tuberculosis* interaction: Implications for novel drug discovery and vaccine development	Department of Biotechnology, New Delhi	27.06.2016
Development of tocopherol succinate anchored nano-constructs bearing paclitaxel for synergistic efficacy against bone metastatic breast cancer: Crosstalk between breast cancer and bone	Department of Biotechnology, New Delhi	15.09.2016
Collaborative Research Programs in specific fields of mutual interest in Ayurveda , Siddha and Unani drugs	Banaras Hindu University, Varanasi	17.11.2016
Synthesis and antiparasitic activities of quinoline-tetrahydropyrimidine hybrids with special reference to antimalarial, antileishmanial and antifilarial activities	Department of Biotechnology, New Delhi	18.11.2016
Secrecy Agreements		
Synthesis of CDRI compounds 97/78, 99/373 under cGMP conditions	TCG Life Sciences Pvt. Ltd., Kolkata	07.04.2016
Information disclosed by CSIR-CDRI and DRF for evaluation	Dabur Research Foundation, Ghaziabad	22.04.2016
To evaluate the CSIR-CDRI and AHPR hit/lead/candidate drugs/ molecules for evaluation	Aadya Herbal Pharmaceutical & Research Pvt. Ltd., Lucknow	26.04.2016
CSIR-CDRI Compound 80/574,S007-867 and inhalable microparticles containing isoniazid and Rifabutin formulation for tuerculosis	BAL Research foundation, Bengaluru	01.06.2016
Information disclosed by CSIR-CDRI and INTAS to each other for development of their hit/lead/candidate drugs/molecules and utilizing the R&D facilities	INTAS Pharmaceuticals Limited, Ahmedabad	16.06.2016
Information disclosed by CSIR-CDRI and ZYDUS in the area of anti-infective drugs pertaining to bacterial and fungal infections	Cadila Healthcare Ltd., Ahmedabad	17.06.2016
Confidential Information to each other on Medicinal Chemistry Research and development studies w.r.t.CDRI lead/candidate drugs	Prof. Serge Mignani, Former Head, Medicinal Chemistry, Sanofi, Chatenay,France	15.09.2016
CDRI synthetic compound 80/574 as antidyslipidemic especially in dyslipidemia of diabetes, metabolic syndrome & obesity	Wockhardt Limited, Mumbai	23.11.2016
Information disclosed by CSIR-CDRI and Sphaera Pharma to each other for development of their hit/lead/candidate drugs/molecules and utilizing the R&D facilities on mutually agreed terms and conditions	Sphaera Pharma Pvt. Ltd., New Delhi	02.12.2016
CDRI synthetic oral bone anabolic agent S008-399 (Bonjoin)	Ortho Regenics Private Limited, Hyderabad	27.12.2016
Consultancy Agreements		
Consultancy on bone biology including osteoporosis covering the pathology, animal model, clinical and preclinical end points and treatments	GSKCH, Gurgaon	18.02.2016
Consultancy services in the area of TEM /DLS analysis of liposomes/vesicles	Galaxy Surfactants Ltd., Navi Mumbai	15.03.2016
Material Transfer Agreements		
Plasmids (#49155 mCh-Sec61 beta, #24920 pEGFP-LC3 (human; 36208 pm Turquoise 2 – Mito)	Addgene, USA	19.01.2016
Plant extract of *Tinospora Cordifolia* (PETC	Barts Cancer Institute, University of London, UK	10.02.2016
Synthetic peptide (P110/its circular analogue)	Stanford University, Stanford, USA	26.02.2016
1-H-RAS plasmid in P. blueselept KS	Addgene, USA	02.03.2016
Mutant rodent malaria parasite *P. berghei* ANKA (line 1808, flp@uis4), Mutant rodent malaria parasite *P. berghei* ANKA (line 1809, flpl@trap), -Plasmid DNA construct pL0033, -Plasmid DNA construct pL0045, - Plasmid DNA construct pL0049	Academisch Ziekenhuis Leiden, Leiden University Medical Center, Leiden, Netherlands	25.04.2016
HL-60 cell line	ATCC, USA	27.04.2016
ATCC-CRL-7566 HS832(C), T; Ovarian Cyst.; Human (Homo sapiens)	ATCC, USA	12.05.2016
Mosquito cell line harboring Wolbachia	Dept. of Entomology, University of Minnesota, USA	18.05.2016
Plasmid for *S. aureus* molecular biology	Institute Pasteur, France	06.06.2016
Leishmania donovani expressing EGFP & *Leishmania major* expressing EGFP	National Centre for Cell Science, Pune	04.07.2016
Plasmids pcDNA3 Flag beta-1, pcDNA3-beta-2-adrenergic receptors, pWPXL-c-Myc & pL-CRISPR.EFS.PAC	Addgene, USA	18.07.2016
Plasmids pRMC2 (68940), pMAY (68939), pETDuet-1HisTag_hNMT_Nef (66078)	Addgene, USA	22.07.2016

PaGFP-H-RaSG12V and pcDNA-HA-H-Ras-wt plasmids	Addgene, USA	07.09.2016
Recombinant plasmids Clones	Addgene, USA	08.09.2016
Bacterial stab cultures containing desired gene overexpression and inhibitory plasmid vectors	Addgene, USA	28.11.2016
Plasmid pGEX-EGFAB	Addgene, USA	05.12.2016
Amendment Agreements		
Information disclosed by CSIR-CDRI and Sun for evalution to each other	Sun Pharma Advanced Research Co. Ltd., Vadodara	18.05.2016
A CSIR-CDRI formulation on inhalable microparticles containing isoniazid and rifabutin	Camus Pharma Pvt. Ltd., Jaipur	26.07.2016
Termination Agreements		
Termination agreement for the CDRI product Gugulipid	Piramal Enterprises Ltd., Mumbai	30.03.2016
Termination of licensing agreement on CDRI Herbal formulation for the treatment and prevention of Cerebral Stroke from plant *Curcuma longa* (Formulation)	Themis Medicare Ltd.Mumbai	01.06.2016
Termination agreement on CDRI compound 97/78	IPCA, Mumbai	17.08.2016
Collaborative Research Agreements		
Collaborative research on mutual interest (5-HT2 & PCSK-9)	DRILS, Hyderabad	21.07.2016
Novel small molecules as selective and positive allosteric modulators (PAM) of 5-HT2C receptor: Discovery and development of potential anti-obesity agents	Dr. Reddy's Institute of Life Sciences, Hyderabad	25.11.2016

b. Intellectual Property activities: Implementation of Intellectual Property Management Policy to ensure timely completion of procedures for filing and grant of patents for the institute and their maintenance. The assignments undertaken during the reporting period are as follows:

- Protection of innovations arising from the institute's pursuits
- Coordination for filing and grant of Indian and foreign applications/patents with CSIR-IPU, CSIR-URDIP, Collaborative partners (Industry & Academia) and IP Law attorneys in respect of various jurisdictions
- Maintenance of Patents and Management of patent portfolio
- Recommendations for renewal of patents/ commercialization status
- Maintenance of information on IP system/ surveillance
- Respond to queries on IP related issues
- Training and dissemination of IP in the region
- Resource lab for DST-TIFAC KIRAN-IPR (Women Scientist) internship

2. S&T Management Activities

The S&T Management Unit is the nucleus of multifarious management and coordination activities at CSIR-CDRI including Project, HRD & HRM, Website & Intranet, ISTAG, RTI, ERP Coordination, Press & Media, Technical Information, Societal Activities, Event Organizations, PRO and other miscellaneous activities. List of assignments undertaken during the reporting period are as follows:

PME Activities

- Vetting of project proposals and processing for approval of the competent authorities
- Monitoring of funds and day to day clearance of indent through the Real Time Budget Monitoring Tool raised by the scientists & other staff members in various projects.
- Incorporation of newly joined staff and new sanctioned projects in SnP software
- Co-ordination with Finance & Accounts and Stores & Purchase
- Maintenance of all kind of project folders and record keeping at central place
- Vetting of expenditure statements, utilization certificates and processing for approval of the competent authorities.
- Processing and obtaining, Security & Sensitivity clearance of the projects involving foreign agencies, from CSIR
- Digitized information management
- Information for ERPS

Human Resources Management & HRD Activities

As per the New Human Resources Management Policy which made a paradigm changes in human resource planning and its management, optimize the output and meet the current as well as future requirements of the Institute and ultimately enhance the productivity of individual.

- Execution of internal transfers of staff
- Background work for recruitment of Technical & Scientific Staff
- Nominations for training programs
- Processing of staff nominations for honours & awards and fellowships
- Processing of requests of staff and research fellows for participation in various fora (Conference/ symposia/seminar/workshop/training programmes)
- Advance Training Courses for Postgraduate Students and for the employees of R&D Institutions/

Pharmaceutical Industry/Government Laboratories, Academic Institutes etc.

- Faculty trainees from Industries and Academia
- IAS, INSA & NASI Summer Fellows
- Postgraduate Research Students training
- Training in Instrumentation (SAIF)
- Training in Laboratory Animal Science for Technical personnel
- Induction and motivation of post graduate students from across the country through arranging interactive lab visit programmes

Dissemination of Technical Information

- Maintaining and updating the CSIR-CDRI Social Media (Facebook & twitter)
- Biological screening services for external users
- Respond to queries from various corners (Govt./ non-Govt. agencies)
- Replies to Parliament and Audit queries
- Print and Electronic Media management
- Communication within and outside the institute
- Management of database on projects, staff, budget, ECF, awards, research fellow's conferences / symposia /seminar / workshops etc.

Institutional Publications

- CSIR-CDRI Annual Report
- CSIR-CDRI Newsletters (two issues per year)
- CSIR-CDRI Advertisements
- Inputs for CSIR News and CSIR Annual Report

ISTAG

- Processing of foreign deputation proposals of scientists and other technical staff visiting abroad to attend Conferences, Meetings, Fellowships, Bilateral exchange programme and instruments trainings etc.
- Providing foreign deputation reports to the Head, ISTAD, CSIR regarding scientists visited abroad
- Arranging training programs for foreign candidates
- Coordination of distinguished foreign visitors/ delegation at CSIR-CDRI
- International collaborative projects, Bilateral International cooperation programs

ERPS

· Co-ordinate and facilitated various groups for integration of the ERPS implementation at CSIR-CDRI

RTI

- Implementation of Right to Information Act-2005 in the institute for Scientific & Technical matters to promote transparency and accountability in the working of every public authority in India

Societal Activities

- Conducting student motivation and health awareness programs in Institute as well as in rural areas.

3. Scientific Directorate

During the year 2016-17, a Scientific Directorate was created by the Director to co-ordinate with the Mission Directorate and Project Planning and Business Development Directorate at CSIR Hq for effective R&D Planning for the coming years. Activities of the Scientific Directorate at CSIR-CDRI, during 2016-17 include:

1. Support in overall R&D Planning activity of the Institute. Preparation of proposal documents, organizing of expert review meetings, minutes, etc. Major documents collated during the year includes:
   - Policy and Road Map for Specific Deliverables in the "Science, Technology & Innovation Space of Nation"
   - National Vision for 2017-2030 and 7-Year Strategy for 2017-24 and 3 years (2017-20) Action Plan documents for NITI Aayog
   - Proposals for International Collaborations identified at National level
   - Phytopharmaceutical Mission Proposal
   - CSIR-CDRI Innovation Hub
2. Preparation of background papers/documents and policy drafts
   - Progress Report on Dehradun Declaration
   - Background Information Document for the Performance Appraisal Board (PAB)
   - CSIR-CDRI Skill Development Programs for catalyzing the skills landscape in India in the ''Health and Pharmaceutical Sector"
   - Health Mission
   - Report for TB Consortium
   - Atal Incubation Centres
   - Proposal for S&T Cooperation between CSIR and the National Institute of Advanced Industrial Science and Technology (AIST), Japan
   - Inputs for India - Sri Lanka Joint S&T Committee
   - Inputs provided for Indo-German S&T cooperation
3. Preparation of reports/documents
   - Revised Budget Estimates (RE – BE)
   - Renewal of Registration of Public Funded Research Institution Certificate for exemption in Custom and Central Excise
   - Write ups on CSIR-CDRI Products and Services
   - Brochure on CSIR-CDRI Profile
   - CSIR-CDRI Profile Book
   - Budget statements of Network Projects

- Report for the Dept. related Parliamentary Standing Committee on S&T, Environment and Forests, on 23rd August, 2016 regarding Malaria
- CSIR Healthcare profile

4. Collation and analysis of information pool for informed decisions
5. Implementation & follow up reports on policy decisions taken by the Director from time to time
6. Coordination of Parliamentary queries

4. Sophisticated Analytical Instrument Facility

Sophisticated Analytical Instrument facility at CSIR-Central Drug Research Institute, Lucknow is more than 40 years old and is one of the first four such facilities set up by the Department of Science & Technology (DST), Government of India for fulfilling the following objectives:

- Provide facilities of Sophisticated Analytical Instruments to CSIR-CDRI scientists and other users from academic institutes, R&D laboratories and industries to enable them to carry out measurements for R&D work.
- Acquire and develop capability for preventive maintenance and repair of sophisticated instruments and organize short term courses/ workshops on the use and application of various instruments and analytical techniques.
- Development of new measurement/analytical techniques: Apart from providing routine analytical techniques/methods of analysis available on the instruments, efforts are made by the SAIF to develop new techniques/methods of analysis to put the instruments to their full use and offer them to the scientists for exploring new dimensions in research in various areas of science and technology.
- Train technicians for maintenance and operation of sophisticated instruments
- Organize training programs and workshops for internal and external candidates.
- Apart from providing analytical services, SAIF is involved in R & D activity of the institute with several ongoing projects a large number of Ph.D. students.

Name of the facility	External Samples	Internal Samples	Total no of samples analyzed
Mass spectrometry	1697	37933	39657
NMR spectroscopy	1111	30985	32096
IR & UV-Vis spectroscopy	395	4030	4425
Flowcytometry	64	22480	22538
HPLC & OR	28	2387	2411
Micro Analysis	327	493	820
Electron Microscopy	135	2382	2504
Total	**3757**	**100690**	**104451**

5. Academic Affairs Unit

The unit serves as a centre for the management of research students (PAs/JRFs/SRFs/RAs) working in different departments of the institute. The activities carried out during the period include:

- Completion of pre-Ph.D. course work (Ist and IInd semester) under CSIR-CDRI Ph.D. program for JNU and AcSIR students (total 62) for the session Jan 2016
- Coordinated centralized admission of junior research fellows under JNU for CDRI-Ph.D. program through interview for the batch commencing January 2017
- Coordinated centralized admission of JRF/ SRFs for registration under AcSIR for CDRI-PhD program through interview for the batches commencing August 2016
- Liaised with Jawaharlal Nehru University, New Delhi for timely registration, synopsis approval, panel of examiners approval, thesis submission, Ph.D. viva at CSIR-CDRI
- Conducted viva voce exams of 67 students registered with JNU New Delhi and 26 students registered with AcSIR at CSIR-CDRI (total-93)
- Coordinated with JNU, AcSIR and other universities for submission of hundred and one (101) Ph.D. thesis for the award of Ph.D. degree from respective universities
- Liaised with AcSIR-HQ for the registration of students working at CSIR-CDRI
- Comprehensive exams of AcSIR students were held
- Screening and endorsement of post-doctoral application forms being submitted by Ph.D. students from outside CSIR-CDRI to Indian funding agencies
- Meeting of CSIR-CDRI-JNU academic council was organized at CSIR-CDRI
- Upgraded and Implemented new “Human Resource Management System” software dealing with the online registration of research students (JRFs/SRFs/PAs/RAs) with the help of Computer division
- Coordinated with AcSIR for submission of Ph.D. thesis and successful conduction of viva-voce examination of twenty six (26) students at CSIR-CDRI
- Formation and Implementation of DAC (Doctoral Advisory Committee) for JNU students of five academic years, 20011-2016
- Five meetings of CSIR-CDRI Academic Council were held to prepare guidelines for carrying out academic activities in the institute

- Formation of DAC (Doctoral Advisory Committee) for AcSIR students
- Formation of Comprehensive Examination Committee (CEC) for AcSIR students
- Coordinated AcSIR 800 course work of AcSIR students
- Coordinated the nomination of annual day awards for students under five different categories of memorial awards for the year 2016 (Dr MM Dhar, Dr JM Khanna & Dr Swarn Nitya Anand Awards)
- Students were nominated for Eli-Lilly best thesis award for the year 2015-2016
- Students were nominated for Eli-Lilly best thesis award for the year 2014-2015

6. National Laboratory Animal Facility

The National Laboratory Animal Center (NLAC) of CSIR-CDRI breeds and maintains different species of laboratory animals required for use in approved biomedical experimentation and research programs of the institute. During the reported period, this facility ensured supply of healthy and defined animals for in-house and extramural research projects. Besides, the center, within the regulatory provisions, also fulfilled the need of research animals and their tissues, organs, blood or sera samples demanded by other Government and corporate institutions for research purposes. The center maintained the quarantined tested Rhesus and Langoor monkeys obtained from recognized animal supplier for experimental usage in CPCSEA approved research projects. In the facility, the health monitoring of all experimental animals was ensured through employing various laboratory techniques including microbiological, parasitological (ecto- and endoparasites), pathological, radiological, tuberculin testing and post mortem investigations with a view to generate reproducible and consistent research findings of the animal experiments. Analysis of laboratory animal feed, animal feed trial studies, production of special research diets, like high fat diet, high sucrose diet, high cholesterol diet etc were also performed as and when required. The facility had also been involved in HRD programme in laboratory animal science through conducting hands-on training modules in animal ethics, care, breeding, management, health monitoring and quality control of laboratory animals including nonhuman primates, nutritional monitoring, animal techniques, and diagnosis and control of laboratory animal diseases. Scientific and technical consultancy services were also extended to other institution for creating and developing Research Animal Facilities.

a) Population status of laboratory animals as on (date)

Animal Species	Strain(s)	Genotype(s)	Population status (Numbers available)
Mouse	Swiss	Out-bred	4336
	Park's strain (PS)	Out-bred	205
	BALB/C	Inbred	3266
	AKR	-do-	334
	NZB	-do-	63
	AJ	-do-	779
	C57BL/6	-do-	2316
	NOD	-do-	74
	db/db	-do	2852
	Apo e	-do-	97
	DBA/1j	-do-	130
	C3H/Hej	-do-	633
	NCF-1	-do-	131
	NOS-1Tg	-do-	8
	APO'E'	-do-	67
	Lepr(db)\J	-do-	48
	NOS-2	-do-	66
	MK2	-do-	10
	APOE/NOS1	-do-	28
Rat	Sprague Dowley (SD)	Out-bred	5330
	Druckrey(DR)	-do-	44
	Charles Foster (CF)	-do-	1206
	Wistar	Inbred	1404
	SHR	-do-	433
Hamster	Golden hamster (GH)	Out-bred	1655
	Golden Hamster	Inbred	499
	White hamster (Mutant of GH)	-do-	65
Gerbil	Mongolian strain	Out-bred	452
Mastomys	Coucha strain	Out-bred	808
Guinea Pig	English albino	Out-bred	1537
Rabbit	New Zealand White	Out-bred	286
	Belgian	Out-bred	164
Sheep	Farm-bred	(random)	2
Monkey	Rhesus	Wild caught	51

b) Supply of experimental animals for research purposes:

Total 29,978 animals were supplied for research studies. Out of which 2959 costing ₹ 27,89,550/- animals were supplied to outside institutions including government establishments, companies and research organizations.

No.	Services Details	Total supplies
A.	Supply of research animals to CDRI in-house projects	22736
B.	Supply of animals to Extramural funded projects in CDRI	4283
C.	Supply of animals to CPCSEA registered institutions for research purposes 1. Govt. funded 2. Private sector	 2018 941
Total animal supplies for biomedical research and experimentation:		**29,978**

c) Other technical services rendered:

• Screening of animals for Endo and Ectoparasites	932 nos.
• Pathological monitoring including gross and post mortem investigations	71 cases
• Hematological and biochemical examinations	225 samples
• Nonhuman primates purchased	42 nos.
• Number of nonhuman primates under rehabilitation	16 nos.
• Number of CPCSEA approved monkey experiments completed	2 nos.
• Number of PPD testing conducted	85 nos.
• Proximate analysis of animal feed	12 samples
• Production of CDRI laboratory animal feed for in-house and research usage	> 650 Qts

7. Tissue & Cell Culture Laboratory

Tissue & Cell Culture Laboratory has been established with an objective to develop & upkeep of Central Tissue Culture Facility including maintenance, propagation, cryopreservation & revival of Cell Lines. Conduct research on exploring the anti-breast cancer profile of Centchroman & also initiate newer technologies such as Stem Cell Research.

Tasks carried out/services provided during reporting period:

- Provision of Cell Culture Flasks to user scientists
- Incorporation of New Cell Lines
- Provide training in Cell & Tissue Culture Techniques to people from within & outside the Institute

Services Provided:

T-25 Cell Culture Flasks numbering 49 of various cell lines were made available to the user scientists within the Institute.

List of cell lines under maintenance (Name of cell lines)

i)	MCF-7	Human Breast Cancer ER +ve
ii)	MDA MB 231	Human Breast Cancer ER -ve
iii)	L 929	Mouse Connective tissue fibroblasts
iv)	HEK 293	Human Embryo Kidney
v)	H9c2	Rat myoblasts
vi)	Hep G2	Human Liver carcinoma
vii)	Hep 3B	Human Liver carcinoma
viii)	3T3 L1	Mouse Embryo fibroblasts
ix)	J774 A.1	Mouse Macrophage
x)	Vero C 1008	African Green Monkey Kidney fibroblasts
xi)	C 6	Rat Glioma
xii)	L 6	Rat Muscle
xiii)	SHSY 5Y	Human Neuroblastoma
xiv)	hGF	Human Gingival fibroblast- Primary culture
xv)	Neuro-2A	Mouse Neuroblastoma
xvi)	BV-2	Mouse Microglia

7. Information Technology Services

A) Software Development: Computer Division has developed and implemented the following software during the reporting period :

- Compound Submission and Bio-Assay Reporting(CBRS) System
- New CDRI internet website
- Recruitment websites for Technical Staff, Project Assistants etc.
- Online Sample Submission/Analysis and Equipment Booking software for SAIF
- Bill tracking System
- Biometric based attendance system for students
- AE-BAS system implementation for regular staff
- MIS application for AE-BAS attendance records of regular employees
- Feature enhancements in HRMS system for students
- Software for online Digital Herbarium
- Online Electrical/Civil Job cards and Gate pass request submission
- Software for dispensary automation (under-implementation)
- Instrument online pre-booking system
- TRT Database
- Other software like: Subject expert database, Alumni database, online registration for seminars etc.

B) 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 SAN systems
- Software maintenance and support for SnP Software, Intranet and other in-house developed software
- Comprehensive IT support to institute wide users comprising of approximately 1000 clients.
- Web hosting services for several publicly accessible websites including institute's internet website (www.cdri.res.in)
- Preparation of Standard Operation Procedure (SOP) for Protection and validation of Hardware and Software under GLP
- Hosting of CDRI tenders on NIC Central Public Procurement Portal

- Helpdesk for ERP & AEBAS user support
- Videoconferencing facility
- Operation and Management of CCTV and access control systems
- ICT support for Audiovisual arrangements
- Operation and Management of Telephone exchange

9. S&T Knowledge Resource Centre

The S&T Knowledge Resource Centre (KRC) has been established with an objective to provide biomedical information services for the scientists in the era of information boom. The centre also caters to the need of the pharmaceutical industry, entrepreneurs, and researchers involved in biomedical research. The centre is computerized and conforms to the norms of e-governance. KRC continued to provide information services to its users and a total of 1255 outside users (Students of M. Pharm, Biotechnology, Biomedical Sciences) utilized these services during the year. Its present collection comprises of 22494 books and 73969 bound volumes of journals. Centre also provides access to various e-journals, open source resources and bibliographic databases viz- Scifinder, Web of Science, R&D Insight etc. The centre also manages, maintains and updates the institute website and institutional repository. The centre published a monthly periodical 'Drugs & Pharmaceuticals Industry Highlights' incorporating periodical 'Drugs & Pharmaceutical R&D Highlights'.

In addition centre provides services to the scientists of institute and other scientific organizations in photography, power point presentations, exhibitions, display panels, posters, designing of covers and layouts for institutional publications.

10. Other Lab Services

Instrumentation Centre provided efficient and economical repair, maintenance and upkeep of different sophisticated analytical, biomedical, electronics and laboratory equipments in CSIR-CDRI and CDRI-SAIF. Due to non-availability of imported components/spares, equivalent indigenous substitute were used to ensure the smooth functioning of equipments. Tracing of part of circuit were carried out whenever circuit diagram/service manual was not available. Technical specification verification was carried out for the procurement of state of the art new equipments. Division helped the user Scientists to prepare broad based technical specification and to choose right equipment to suit their application. Laboratory equipments of different divisions of institute were calibrated as per GLP guidelines as per user requirement. Division reviewed the SOP (Instrument Maintenance) of different Instruments.

11. Grievance Redressal Cell

For prevention of sexual harassment of women at workplace during the reporting period one complaint recieved on 10.06.2016 which was disposed of on 03.08.16

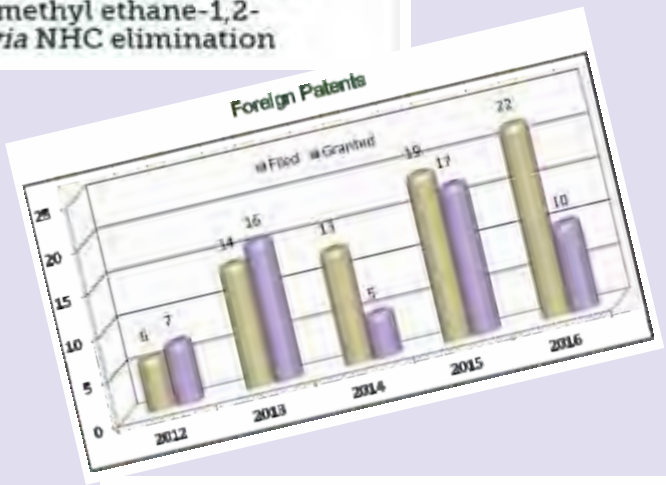
12. Laboratory Engineering Services

The Lab Engineering Services division continued to provide Engineering Services to the Institute to maintain the Infrastructure for R&D work. The major works carried out during reporting period are as follows:

- New facilities of centralized compressed air, Nitrogen, LPG & Vacuum, distilled water supply at the user bench in laboratory has been provided
- Most sophisticated laboratory set up i.e. reaction hoods, chemical storage cabinet and safety measures
- Laboratory follows safety provision along with most sophisticated optical fume sensor, fire alarms and computer controlled fire alarm panels
- CSIR-CDRI is committed to share environmental & social responsibility therefore, facility of Effluent treatment plant for treatment of laboratory waste and sewage treatment plant for treatment of domestic waste water has been created in Jankipuram campus
- The laboratory compliances all the statuary norms from various state and central agencies and committed to follow the guidelines issued by various agencies time to time
- Laboratory has integrated water lines to reuse of ETP/STP treated water in Garden hydrant line to optimize water consumption

75 Years of
CSIR Touching Lives

Research Output



CSIR-Central Drug Research Institute, Lucknow

CSIR-Central Drug Research Institute, Lucknow

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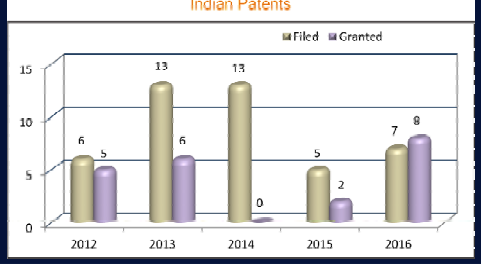

Patents

Patents Granted Abroad

1. **Korean Patent No.:** 10-1686607 **Date of Grant:** 08.12.2016

   Title: Substituted benzfurochromenes and related compounds for the prevention and treatment of bone related disorders

   Inventors: Atul Goel, Amit Kumar, Sumit Chaurasia, Divya Singh, Abnish Kumar Gautam, Rashmi Pandey, Ritu Trivedi, Man Mohan Singh, Naibedya Chattopadhyay, Lakshmi Manickavasagam, Girish Kumar Jain & Anil Kumar Dwivedi

   Supporting Staff: Abdul Malik & Avinash Kumar

2. **European Patent No.:** 2670722 **Date of Grant:** 12.10.2016

   Title: Chiral 3-aminomethylpiperidine derivative as inhibitors of collagen induced platelet activation and adhesion

   Inventors: Dinesh Kumar Dikshit, Madhu Dikshit, Tanveer Irshad Siddiqui, Anil Kumar, Rabi Sankar Bhatta, Girish Kumar Jain, Manoj Kumar Barthwal, Ankita Misra, Vivek Khanna, Prem Prakash, Manish Jain, Vishal Singh, Varsha Gupta & Anil Kumar Dwivedi

   Supporting Staff: Surendra Singh, CP Pande, Kanta Bhutani, M S Ansari & Devendra Singh

3. **Chinese Patent No.:** ZL200980152325.9 **Date of Grant:** 31.08.2016

   Title: Substituted benzfurochromenes and related compounds for the prevention and treatment of bone related disorders

   Inventors: Atul Goel, Amit Kumar, Sumit Chaurasia, Divya Singh, Abnish Kumar Gautam, Rashmi Pandey, Ritu Trivedi, Man Mohan Singh, Naibedya Chattopadhyay, Lakshmi Manickavasagam, Girish Kumar Jain & Anil Kumar Dwivedi

   Supporting Staff: Abdul Malik & Avinash Kumar

4. **Korean Patent No.:** 10-1646770 **Date of Grant:** 02.08.2016

   Title: Novel donor-acceptor flurene scaffolds:a process and uses thereof

   Inventors: Atul Goel, Sumit Chaurasia, Vijay Kumar, Sundar Manoharan, Raghubir Singh Anand

5. **Japanese Patent No.:** 5957058 **Date of Grant:** 24.06.2016

   Title: *Ulmus wallichiana* planchon derived extract,designated as “osteoanabol” and its compounds employed in prevention or treatment of osteo-health related disorders

   Inventors: Rakesh Maurya, Preeti Rawat, Kunal Sharan, Jawed Akhtar Siddiqui, Gaurav Swarnkar, Geetanjali Mishra, Lakshmi Manickavasagam, Girish Kumar Jain, Kamal Ram Arya & Naibedya Chattopadhyay

6. **German Patent No.:** 1807408 **Date of Grant:** 08.06.2016

   Title: Oxy substituted flavones as antihyperglycemic and antidyslipidemic agents

   Inventors: Ram Pratap, Mavurapu Satyanarayana, Chandeshwar Nath, Ram Raghubir, Anju Puri, Ramesh Chander, Priti Tiwari, Brajendra Kumar Tripathi & Arvind Kumar Srivastava

   Supporting Staff: Ashok Kumar Khanna

7. **French Patent No.:** 1807408 **Date of Grant:** 08.06.2016

   Title: Oxy substituted flavones as antihyperglycemic and antidyslipidemic agents

   Inventors: Ram Pratap, Mavurapu Satyanarayana, Chandeshwar Nath, Ram Raghubir, Anju Puri, Ramesh Chander, Priti Tiwari, Brajendra KKumar Tripathi & Arvind Kumar Srivastava

   Supporting Staff: Ashok Kumar Khanna

8. **Swedish Patent No.:** 1807408 **Date of Grant:** 08.06.2016

   Title: Oxy substituted flavones as antihyperglycemic and antidyslipidemic agents

   Inventors: Ram Pratap, Mavurapu Satyanarayana, Chandeshwar Nath, Ram Raghubir, Anju Puri, Ramesh Chander, Priti Tiwari, Brajendra Kumar Tripathi & Arvind Kumar Srivastava

   Supporting Staff: Ashok Kumar Khanna

9. **Great Britain Patent No.:** 1807408 **Date of Grant:** 08.06.2016

   Title: Oxy substituted flavones as antihyperglycemic and antidyslipidemic agents

   Inventors: Ram Pratap, Mavurapu Satyanarayana, Chandeshwar Nath, Ram Raghubir, Anju Puri, Ramesh Chander, Priti Tiwari, Brajendra KKumar Tripathi & Arvind Kumar Srivastava

   Supporting Staff: Ashok Kumar Khanna

10. **United States of America Patent No. :** 9327009 **Date of Grant:** 03.05.2016

Title: Peptide inhibitors as novel anti-HIV therapeutics

Inventors: Raj Kamal Tripathi, Balwant kumar, Ravishankar Ramachandran, Jitendra Kumar Tripathi, Smrati Bhadauria & Jimut Kanti Ghosh

Patents Filed Abroad

1. **European Application No.:** 15744364.9 **Date of Filing:** 09.12.2016

Title: Cationic lipid cordiarimide hybrid compounds and a process for preparation thereof

Inventors: Bathula Surendar Reddy, VKK Durga Rao, Komal Sharma, M Prathap Reddy, Dibyendu Banerjee & Deependra Kumar Singh

2. **United States of America Application No.:** 15/317,294 **Date of Filing:** 08.12.2016

Title: Cationic lipid cordiarimide hybrid compounds and a process for preparation thereof

Inventors: Bathula Surendar Reddy, VKK Durga Rao, Komal Sharma, M Prathap Reddy, Dibyendu Banerjee & Deependra Kumar Singh

3. **Sri Lankan Application No. :** 18980 **Date of Filing:** 09.09.2016

Title: A formulation useful for delivery of neuro protecting agent

Inventors: Anil Kumar Dwivedi, Hafsa Ahmad, Kiran Kumar Khandelwal, Neelam Singh Sangwan, Jiaur Rahaman Gayen, Smrati Bhaduaria, Srikanta Kumar Rath, Sharad Sharma, Rakesh Shukla, S P S Gaur , Vivek Vidyadhar Bhosale, Rajender Singh Sangwan & Sarika

Supporting Staff: Sheeba Saji Samuel, P K Agnihotri, Navodyam Kalleti, Anurag Kumar Srivastava & Anupama

4. **South African Application No. :** 2016/05764 **Date of Filing:** 18.08.2016

Title: A formulation useful for delivery of neuro protecting agent

Inventors: Anil Kumar Dwivedi, Hafsa Ahmad, Kiran Kumar Khandelwal, Neelam Singh Sangwan, Jiaur Rahaman Gayen, Smrati Bhaduaria, Srikanta Kumar Rath, Sharad Sharma, Rakesh Shukla, S P S Gaur , Vivek Vidyadhar Bhosale, Rajender Singh Sangwan & Sarika

Supporting Staff: Sheeba Saji Samuel, P K Agnihotri, Navodyam Kalleti, Anurag Kumar Srivastava & Anupama

5. **German Application No.:** 05718507.60 **Date of Filing:** 08.06.2016

Title: Oxy substituted flavones as antihyperglycemic and antidyslipidemic agents

Inventors: Ram Pratap, Mavurapu Satyanarayana, Chandeshwar Nath, Ram Raghubir, Anju Puri, Ramesh Chander, Priti Tiwari, Brajendra Kumar Tripathi & Arvind Kumar Srivastava

Supporting Staff: Ashok Kumar Khanna

6. **French Application No.:** 05718507.60 **Date of Filing:** 08.06.2016

Title: Oxy substituted flavones as antihyperglycemic and antidyslipidemic agents

Inventors: Ram Pratap, Mavurapu Satyanarayana, Chandeshwar Nath, Ram Raghubir, Anju Puri, Ramesh Chander, Priti Tiwari, Brajendra Kumar Tripathi & Arvind Kumar Srivastava

Supporting Staff: Ashok Kumar Khanna

7. **Swedish Application No.:** 05718507.60 **Date of Filing:** 08.06.2016

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Inventors: Ram Pratap, Mavurapu Satyanarayana, Chandeshwar Nath, Ram Raghubir, Anju Puri, Ramesh Chander, Priti Tiwari, Brajendra Kumar Tripathi & Arvind Kumar Srivastava

Supporting Staff: Ashok Kumar Khanna

8. **Great Britain Application No.:** 05718507.60 **Date of Filing:** 08.06.2016

Title: Oxy substituted flavones as antihyperglycemic and antidyslipidemic agents

Inventors: Ram Pratap, Mavurapu Satyanarayana, Chandeshwar Nath, Ram Raghubir, Anju Puri, Ramesh Chander, Priti Tiwari, Brajendra KKumar Tripathi & Arvind Kumar Srivastava

Supporting Staff: Ashok Kumar Khanna

9. **United States of America Application No. :** 15/025864 **Date of Filing:** 29.03.2016

Title: 3,7 Diazabicyclo[3.3.1]nonane carboxamides and process of preparation thereof

Inventors: Dinesh Kumar Dikshit, Anil Kumar Karunakaran Sasikala, Manoj Barthwal, Ankita Mishra & Manish Jain

10. **European Application No. :** 14759059.0 **Date of Filing:** 26.03.2016
Title: 3,7 Diazabicyclo[3.3.1]nonane carboxamides and process of preparation thereof
Inventors: Dinesh Kumar Dikshit, Anil Kumar Karunakaran Sasikala, Manoj Barthwal, Ankita Mishra & Manish Jain

11. **United States of America Application No. :** 15/024181 **Date of Filing:** 23.03.2016
Title: An antileukemic agent useful for inducing differentiation in myeloid leukemia cells
Inventors: Pooja Pal, Savita Lochab, Jitendra Kumar Kanaujia, Sabyasachi Sanyal & Arun Kumar Trivedi

12. **Brazilian Application No. :** 112016004289-1 **Date of Filing:** 26.02.2016
Title: Novel Aryl Naphthyl methanone oxime(s) and process for preparation thereof
Inventors: Sabyasachi Sanyal, Atul Kumar, Naibedya Chattopadhyay, Jawahar Lal, Arun Kumar Trivedi, Dipak Datta, Srikanta Kumar Rath, Tahseen Akhtar, Shailendra Kumar Dhar Dwivedi, Manisha Yadav, Bandana Chakravarti, Abhishek Kumar Singh, Jay Sharan Mishra, Nidhi Singh & Anil Kumar Tripathi

13. **European Application No. :** 14786724.6 **Date of Filing:** 26.02.2016
Title: Novel Aryl Naphthyl methanone oxime(s) and process for preparation thereof
Inventors: Sabyasachi Sanyal, Atul Kumar, Naibedya Chattopadhyay, Jawahar Lal, Arun Kumar Trivedi, Dipak Datta, Srikanta Kumar Rath, Tahseen Akhtar, Shailendra Kumar Dhar Dwivedi, Manisha Yadav, Bandana Chakravarti, Abhishek Kumar Singh, Jay Sharan Mishra, Nidhi Singh & Anil Kumar Tripathi

14. **US Application No. :** 14/915194 **Date of Filing:** 26.02.2016
Title: Novel Aryl Naphthyl methanone oxime(s) and process for preparation thereof
Inventors: Sabyasachi Sanyal, Atul Kumar, Naibedya Chattopadhyay, Jawahar Lal, Arun Kumar Trivedi, Dipak Datta, Srikanta Kumar Rath, Tahseen Akhtar, Shailendra Kumar Dhar Dwivedi, Manisha Yadav, Bandana Chakravarti, Abhishek Kumar Singh, Jay Sharan Mishra, Nidhi Singh & Anil Kumar Tripathi

15. **European Application No. :** 14832930.3 **Date of Filing:** 02.02.2016
Title: Ulmoside-A-derived compound from *Ulmus Wallichiana* Planchon useful for prevention or cure of metabolic diseases
Inventors: Sanyal Sabyasachi, Naibedya Chattopadhyay, Rakesh Maurya, Jiaur Rahman Gayen, Smrati Bhadauria, Arun Kumar Trivedi, Abhishek Kumar Singh, Jay Sharan Mishra, Rashmi Kumari, Kunal Sharan, Mohd. Parvez Khan, Kainat Khan, Nidhi singh, Shailendra Kumar Dhar Dwivedi, Manisha Yadav, Preety Dixit, Devendra Pratap Mishra & Sharad Sharma

16. **United States of America Application No. :** 14/909676 **Date of Filing: 02**.02.2016
Title: Ulmoside-A-derived compound from *Ulmus Wallichiana* Planchon useful for prevention or cure of metabolic diseases
Inventors: Sanyal Sabyasachi, Naibedya Chattopadhyay, Rakesh Maurya, Jiaur Rahman Gayen, Smrati Bhadauria, Arun Kumar Trivedi, Abhishek Kumar Singh, Jay Sharan Mishra,Rashmi Kumari, Kunal Sharan, Mohd. Parvez Khan, Kainat Khan, Nidhi singh, Shailendra Kumar Dhar Dwivedi, Manisha Yadav, Preety Dixit, Devendra Pratap Mishra & Sharad Sharma

17. **Brazilian Application No. :** BR112016002244-0 **Date of Filing:** 01.02.2016
Title: Ulmoside-A-derived compound from *Ulmus Wallichiana* Planchon useful for prevention or cure of metabolic diseases
Inventors: Sanyal Sabyasachi, Naibedya Chattopadhyay, Rakesh Maurya, Jiaur Rahman Gayen, Smrati Bhadauria, Arun Kumar Trivedi, Abhishek Kumar Singh, Jay Sharan Mishra,Rashmi Kumari, Kunal Sharan, Mohd. Parvez Khan, Kainat Khan, Nidhi singh, Shailendra Kumar Dhar Dwivedi, Manisha Yadav, Preety Dixit, Devendra Pratap Mishra & Sharad Sharma

18. **Canadian Application No. :** 2917921 **Date of Filing:** 20.01.2016
Title: Pharmaceutical composition for the treatment of diminution of bone tissue
Inventors: Ritu Trivedi, P R Mishra, Neelam S Sangwan, Prabodh Trivedi, Divya Singh, Rajendra S Sangwan, Priyanka Kushwaha, Vikram Khedgikar, Sulekha Adhikari, Dharmendra Choudhary, Jyoti Swarup, Avinash Kumar, Anirudha Karvande, Ashwni Verma & Shweta Sharma
Supporting Staff: Naseer Ahmed

19. **European Application No. :** 14759347.9 **Date of Filing:** 20.01.2016
Title: Pharmaceutical composition for the treatment of diminution of bone tissue
Inventors: Ritu Trivedi, P R Mishra, Neelam S Sangwan, Prabodh Trivedi, Divya Singh, Rajendra S Sangwan, Priyanka Kushwaha, Vikram Khedgikar, Sulekha Adhikari, Dharmendra Choudhary, Jyoti Swarup, Avinash Kumar, Anirudha Karvande, Ashwni Verma & Shweta Sharma
Supporting Staff: Naseer Ahmed

20. **PCT Application No. :** PCT/IN2016/050019 **Date of Filing:** 15.01.2016

Title: A Novel Antileishmanial Formulation

Inventors: Neena Goyal, Sonali Gangwar, Anil Kumar Kala Sadan, Subhasish Biswas, Anil Kumar Dwivedi, Hafsa Ahmad, Kailash Chand Gupta, Pradeep Kumar, Priyanka Bhatnagar & Sanjay Batra

Supporting Staff: Karthik Ramalingam, V Saravana Kumar

21. **United States of America Application No. :** 14/904981 **Date of Filing:** 14.01.2016

Title: Pharmaceutical composition for the treatment of diminution of bone tissue

Inventors: Ritu Trivedi, P R Mishra, Neelam S Sangwan, Prabodh Trivedi, Divya Singh, Rajendra S Sangwan, Priyanka Kushwaha, Vikram Khedgikar, Sulekha Adhikari, Dharmendra Choudhary, Jyoti Swarup, Avinash Kumar, Anirudha Karvande, Ashwni Verma & Shweta Sharm

Supporting Staff: Naseer Ahmed

22. **Australian Application No. :** 2014291615 **Date of Filing:** 12.01.2016

Title: Pharmaceutical composition for the treatment of diminution of bone tissue

Inventors: Ritu Trivedi, P R Mishra, Neelam S Sangwan, Prabodh Trivedi, Divya Singh, Rajendra S Sangwan, Priyanka Kushwaha, Vikram Khedgikar, Sulekha Adhikari, Dharmendra Choudhary, Jyoti Swarup, Avinash Kumar, Anirudha Karvande, Ashwni Verma & Shweta Sharma

Supporting Staff: Naseer Ahmed

23. **United States of America (Divisional) Application No. :** 14/933843 **Date of Filing:** 05.11.2015

Title: Chiral 3-aminomethylpiperidine derivative as inhibitors of collagen induced platelet activation and adhesion

Inventors: Dinesh Kumar Dikshit, Madhu Dikshit, Tanveer Irshad Siddiqui, Anil Kumar, RabiSankar Bhatta, Girish Kumar Jain, Manoj Kumar Barthwal, Ankita Misra, Vivek Khanna, Prem Prakash, Manish Jain, Vishal Singh, Varsha Gupta & Anil Kumar Dwivedy

Supporting Staff: Surendra Singh, CP Pandey, Kanta Bhutani, M S Ansari and Devendra Singh

24. **United States of America Divisional Application No. :** 14/926771 **Date of Filing:** 29.10.2015

Title: Novel Dolastatin Mimics as Anticancer agents

Inventors: Tushar Kanti Chakraborty, Gajula Praveen Kumar, Dulal Panda & Jayant Asthana

Patents Granted in India

1. **Patent No.:** 278183 **Date of Grant**: 15.12.2016

Title: Synthesis of new fluconazole analogues containing 1,2,3-triazole moiety and having better antifungal spectrum

Inventors: Nilkhant Ganpat Aher, Vandana Sudhir Pore, Manoj Kumar Bhat, Gaddam Balakrishna Shiva Keshava, Awanit Kumar, Nripendra Nath Mishra & Praveen Kumar Shukla

2. **Patent No.:** 278079 **Date of Grant**: 13.12.2016

Title: A novel inhibitor which acts by disrupting HIV-1 NEF-PACS-I protein interactions maintained in HEK-293 cells identified by a new mammalian two-hybrid model

Inventors: Raj Kamal Tripathi, Sudipti Gupta, Dharamsheela, Pankaj Singh, Richa Verma, Jimut Kanti Ghosh & Ravishankar Ramachandran.

3. **Patent No.:** 276287 **Date of Grant**: 10.10.2016

Title: An improved process for preparation of trans-3,4-diarylchroman

Inventors: Devi Prasad Sahu

Supporting Staff: Atma Prakash Dwivedi

4. **Patent No.:** 274841 **Date of Grant**: 11.08.2016

Title: Herbal formulations for local contraception

Inventors: Satyawan Singh, Anil Kumar Dwivedi, Raghwendra Pal, Shekhar Chandra Sharma & Gopal Gupta

5. **Patent No.:** 272087 **Date of Grant**: 16.03.2016

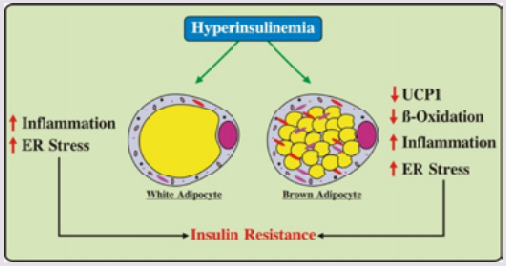
Title: A Mercapto Phenyl Napthyl Methane compounds and preparation therefore

Inventors: Sangita, Kumar Atul, Singh Man Mohan, Jain Girish Kumar, Murthy Puvvada Sri Ramachandra & Suprabhat Ray

6. **Patent No.:** 271697 **Date of Grant**: 29.02.2016
   Title: Substituted 6-(1-aryl ethyl)-1, 2, 4-trioxanes
   Inventors: Chandan Singh, Ajit Shankar Singh & Sunil Kumar Puri
   Supporting Staff: Shashi Rostagi, Akhilesh Kumar Srivastav & Kamlesh Singh
7. **Patent No.:** 271474 **Date of Grant**: 23.02.2016
   Title: Novel substituted benzocycloalkyl azole derivatives as antileishmanial agents
   Inventors: Satyawan Kalpana Bhandari, Nagarapu Srinivas, Shraddha Palne, Nishi & Suman Gupta
   Supporting Staff: Anoop Kumar Srivastava
8. **Patent No.:** 271422 **Date of Grant**: 19.02.2016
   Title: Novel lipophilic ether derivatives of dihydroartemisinin as antimalarials
   Inventors: Chandan Singh, Sandeep Chaudhary & Sunil Kumar Puri
   Supporting Staff: Shashi Rastogi & Akhilesh Kumar Srivastava

Patents Filed in India

1. **Patent Application No.:** 201611022640 **Date of Filing:** 01.07.2016
   Title: Pharmaceutical composition for the prevention and/or treatment of bone related disorders
   Inventors: Ritu Trivedi, Prabhat Ranjan Mishra, Sulekha Adhikary, Naseer Ahmad, Dharmendra Chaudhary, Naresh Mittapelly, Sudhir Kumar, Kapil Dev & Rakesh Maurya
   Supporting Staff: Satish Chandra Tiwari
2. **Patent Application No. :** 201611010438 **Date of Filing:** 28.03.2016
   Title: Pancreastatin inhibitory peptides for the treatment of Diabetes
   Inventors: Jiaur Rahaman Gayen, Guru Raghavendra valicherla, Zakir Hossain, Anand Prakash Gupta, Syed Anees Ahmed, Riyazuddin Mohammed, Mohammad Imran Siddiqi & Sharat Chandra
3. **Patent Application No:** 201611009674 **Date of Filing:** 21.03.2016
   Title: A heritable and inducible RNAi knockdown system in *Leishmania braziliensis*
   Inventors: Amogh Anant Sahasrabuddhe & Niranjan Kumar Veluru
   Supporting Staff: Rajendra Kumar Srivastava
4. **Patent Application No:** 201611009443 **Date of Filing:** 18.03.2016
   Title: Cell selective peptide having antibacterial and anti-endotoxin properties
   Inventors : Jimut kanti Ghosh, Amit Kumar tripathi, Amit Kumar, Anshika Tandon, Praveen K Shukla, Atul Krishna, Jitendra Kumar Tripathi, Rabi Sankar Bhatta & Santosh Kumar Puttrevu
5. **Patent Application No:** 201611003055 **Date of Filing:** 28.01.2016
   Title: An improved process for preparation of 4-substituted amino-2,3-polymethylenequinoline hydrochloride
   Inventors: Mandalapu Dhanaraju, Rajesh Kumar Arigela, Tara Rawat & Vishnu Lal Sharma
   Supporting Staff: Ramjeet
6. **Patent Application No:** 201611003053 **Date of Filing:** 28.01.2016
   Title: Eutectic formulation of migrainolytic for rapid nose-to-brain transport
   Inventors: Rajeev Ranjan & Prem Narayan Yadav
   Supporting Staff: Amit Mishra & Tabassum Khan
7. **Patent Application No:** 201611002387 **Date of Filing:** 22.01.2016
   Title: A controlled release formulation for enhanced oral bioavailability of hydrophobic drug
   Inventors : Manish Kumar Chaurasia, Pankaj Kumar Singh, Kavit Raval, Vivek Kumar Pawar, Hanumanth Srikanth Cheruvu, Jiaur Rahaman Gayen & Anil Kumar Dwivedi
8. **Patent Application No:** 3988DEL2015 **Date of Filing:** 08.12.2015
   Title: 6/8((di(hetero-2-ylmethyl)amino)methyl)-7-hydroxyl-4-(methylthio)-2-oxo-2H-chromene-3-carbonotriles and uses thereof
   Inventors: Atul Goel, Ajay Kumar Jha, Ashutosh Raghuvanshi, Rakesh Kumar Arya & Dipak Datta
9. **Patent Application No:** 3891DEL2015 **Date of Filing:** 30.11.2015
   Title: 6-Substituted-7-hydroxy-4-(methylthio)-2-oxo-2H-chromene-3-carbonitriles as flourescent dyes and uses thereof
   Inventors: Atul Goel, Ashutosh Raghuvanshi, Ajay Kumar Jha, Manoj Kathuria & Kalyan Mitra



Paper Presented in Scientific Conventions

2016

103rd Indian Science Congress 2016, University of Mysore, Mysuru (3-7 January)

- Cloning, Expression and Characterization of Rec A from *Wolbachia* Endosymbiont of Lymphatic Filarial Parasite *Brugia malayi,* Mamta Gangwar, Ruchi Jha, Shailja Misra-Bhattacharya
- Trehalose-6-phosphate-phosphatase of *Brugia malayi:* A promising antifilarial vaccine candidate, Shailja Misra-Bhattacharya

International Conference on Advances in Asian Medicine, co-organized by Bhratiya Vidyapeeth and Society for Ethnopharmacology, Pune (4-7 January)

- Phospholipid complexation of NMITLI118RT+ (a standardized extract of a new chemotype of *Withania somnifera* Dunal): Way to a prudent therapeutic approach for beneficial outcomes in ischemic stroke in rats, Hafsa Ahmad, Abhishek Arya, Satish Agrawal, Rakesh Shukla, Anil Kumar Dwivedi
- Hesperetin enhanced bicalutamide induced mitochondrial membrane depolarization in prostate cancer cells: A pharmacokinetic and toxicity analysis, Abhishek Arya, Hafsa Ahmad, Satish Agrawal, Anil Kumar Dwivedi

Fifteenth Annual Meeting of SFRR-India 2017 (SFRR-INDIA-17) Conference & One Day School on Radiation and Redox Process in Health', Mumbai, (9–12 January)

- Evaluation of comparative protective effect of Quercetin, Rutin, Apigenin, Naringin, Chlorogenic acid and resveratrol on HT-29 cells, Sakshi Mishra, S Srivastava, PK Pandey, J Dewangan, A. Divakar, S K Rath

International Conference on Cardiovascular Translational Research, IIT-Madras (22-24 January)

- Effect of different calorie diets on the metabolic status of p47phox knockout mice, N. Kanuri, SC Rebello, JS Kanshana, JR Gayen, J Kumaravelu, Madhu Dikshit
- Angiotensin II Potentiates the left ventricle remodeling process in the high fat diet fed mice, S S Reddy, Anant Jaiswal, Preeti Maurya, MK Barthwal
- Interleukin-1 Receptor associated Kinase mediates Angiotensin II induced vascular smooth muscle cells proliferation, Preeti-Maurya, S S Reddy, MK Barthwal
- Effect of CDR-267-F018 against dyslipidemia induced cardiovascular complications in ApoE KO atherosclerotic model, Kanshana JS, Rebello SC, Pathak P, Nageswararao K, MN Srivastava, T Narender, AK Dwivedi, Kumaravelu J, MK Barthwal and M Dikshit
- Effect of different calorie diets on the metabolic status of p47^{phox} knockout mice, Nageswararao Kanuri, Sanjay C Rebello, Jitendra S Kanshana, Priya Pathak, Anand P Gupta, Jiaur R Gayen, Kumaravelu J and Madhu Diskhit

Drug Discovery for Parasitic Diseases-Keystone Symposia on Molecular and Cellular biology, California, USA (24-28 January)

- Probing the function of Aspartyl proteases, Plasmepsin VII & VIII in *Plasmodium berghei*, Babu S Mastan, Sandeep Dey, Satish Mishra and Kota Arun Kumar

Kakatiya University, Warangal, Telangana (28-30 January)

- Trehalose-6-phosphate-phosphatase of *Brugia malayi:* A promising antifilarial vaccine candidate, Shailja Misra-Bhattacharya

22nd ISCBC-2016 on Recent Trends in Affordable and Sustainable Drug Discovery and Developments, Uka Tarsadia University, Surat (06-08 February)

- Population Pharmacokinetic modeling in optimizing drug development, J Lal

6th Annual International Conference on Mitochondria in Health and Disease JNU, New Delhi (10 -11 February)

- Regulation of Mitochondrial Proteins during Intracellular Survival of Mycobacteria, Rikesh K Dubey, Alok K Mishra, Shivraj M Yabaji and Kishore K Srivastava

34th Annual Meeting of the Society for Reproductive Biology and Comparative Endocrinology (SRBCE) International Symposium on Integrative Physiology & Comparative Endocrinology along with Brainstorming session on Geno-Eco-Neuroendocrinology, BHU, Varanasi, India (12 -14 February)

- Curcumin attenuates cellular proliferation in endometrial carcinoma cells via ROS- mediated

activation of growth arrest and DNA damage inducible gene 153/CEBP homology protein (GADD153/CHOP), Vijay K Sirohi, P Popli, P Sankhwar, J B Kaushal, K Gupta, and A Dwivedi

- Isoflavone Genistein inhibits EGFR/PI3K/Akt/NF-êB activation and induces apoptosis pathway in human endometrial hyperplasial cells, Vinay shukla, Vishal Chandra, P Sankhwar, P Popli, Vijay Kumar Sirohi, A Dwivedi

International Conference on Metals in Genetics, Chemical Biology and Therapeutics, IISC, Bangalore (17-20 February)

- Identification of TANK and GRP78 as Molecular Targets of Medicarpin in Calvarial Osteoblast Cells via proteomics, Manisha Dixit, Jyoti Kureel, Aijaz Ahmad John, Ashutosh Raghuvanshi, Atul Goel and Divya Singh

BITS Conference on Gene and Genome Regulation, BITS, Pilani, India (18-20 February)

- Role of plants in treatment of diabetes: An update, R Parveen, Savita Mishra, Satish Mishra, and MK Basantani

International Conference on Reproductive Health with Emphasis on Occupational, Environmental and Lifestyle Factors 26th Annual Meeting of the Indian Society for the study of Reproductive & Fertility (ISSRF), NIOH, ICMR Ahmedabad (18- 20 February)

- GPR30/Src kinase- mediated EGFR signalling is involved in regulation of cyclooxygenase-2 expression in rat oviductal epithelial cells , Pooja Popli , Vijay Kumar Sirohi, Vinay Shukla, Jyoti Bala Kaushal , Kanchan Gupta , Anila Dwivedi
- Role of hedgehog/GLI1 signaling in endometrial hyperplasia and its regulatory mechanism, Jyoti Bala Kaushal, Suparna Kumari, Pooja Popli, Pushplata Sankhwar, Kanchan Hajela, Anila Dwivedi
- Integrin beta8 induced FAK activation regulates Vav and Rac1 signaling in the endometrial epithelial cells in the process of endometrial receptivity for embryo implantation, Vijay Kumar, Vineet Kumar Maurya**,** Rajesh Kumar Jha

22nd conference of National Magnetic Resonance Society of India NMRS-2016, IIT, Kharagpur (18-21 February)

- Structure based design synthesis and solution conformation study of $\alpha 3\delta$ and $\alpha 4\beta$ cyclic peptide with $\beta\gamma$ fused turn structure, Gajendra Singh, Pancham Singh Kandiyal, Sudip Pal, Tushar Kanti Chakraborty and Ravi Sankar Ampapathi
- NMR solution conformation studies of neoglycopeptides clicked pentynylated mannose and N-acetylgalactosamine sugar amino acid, Faiyaz Alam,Pancham Singh Kandiyal, Yashoda Krishna, Ravi Sankar Ampapathi, Tushar Kanti Chakraborty
- A novel approach for testing the teratogenic potential of chemicals on the platform of metabolomics: employing HR-MAS NMR spectroscopy, Rohit Mahar, N Sethi, N Sinha, Sanjeev K Shukla

ISSRF-2016, Ahmedabad (19-21February)

- Aldose reductase regulates blood testis barrier, Rajender Singh, MuktanandTripathi

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- Exploiting the diazo group properties for developing novel reactions, Namrata Rastogi

CTDDR-Current Trends in Drug Discovery Research, Lucknow (25-28 February)

- Green Protocols for the One Pot Synthesis of C-C and C-C/C-S Bond in Ionic Liquid, Yogesh Thopate, Richa Singh and Arun K Sinha
- Environmentally benign synthesis of some aryl sulfide analogues with evaluation of their antibacterial activity against *Staphylococcus aureus,* Aditya G. Lavekar, Saima, Danish Equbal, IshaSoni, RiteshThakare, Arun K Sinha and Sidharth Chopra
- Synthesis and antimalarial activities of chalcone-coumarin hybrid molecules and other derivatives, NH Andhare, Y Thopte, K Srivastava and AK Sinha
- Arylsulfide analogues as potent inhibitors of Methicillin and vancomycin resistant Staphylococcus aureus, I Soni, AG Lavekar, Saima, P Karaulia, R Thakare, AK Sinha and S Chopra
- Potentiated Dithiocarbamate Incorporated 5-Nitro Imidazole Derivatives against Resistant Trichomoniasis: Design, Synthesis and Biology, Dhanaraju Mandalapu, Bhavana Kushwaha, J P Maikhuri, Gopal Gupta, VL Sharma
- Design and Synthesis of Novel Arylpiperazines for Benign Prostatic Hyperplasia Management, Sonal Gupta, Deepti Pandey, JP Maikhuri, Gopal Gupta, VL Sharma
- Ca Salts of Dithiocarbamate as Novel Spermicidal Agent, Mala Singh, BhavanaKushwaha**,** JP Maikhuri, Gopal Gupta, VL Sharma
- Resveratrol enhances therapeutic efficacy of celecoxib in colon cancer cell lines, Sonal Srivastava, Jayant Dewangan, Divya Tandon and Srikanta Kumar Rath
- Association between miR-499 polymorphism and susceptibility to oral squamous cell carcinoma,

Divya Tandon, Jayant Dewangan, Sonal Srivastava, Srikanta Kumar

- Evaluation of Cystatin C as potential biomarker for chronic kidney disease, Kavita Durgapal, Vivek Bhosale, Styendra Sonkar, Shail Singh, Mukesh srivastava, MPS Negi, Ashim Ghatak
- Anti-inflammatory potential of Coagulin-L in LPS-induced endotoxemia, SS Reddy, Preeti Maurya, Parul Chauhan, Deepika Saini, Prem P Yadav, MK Barthwal
- Effect of High fat diet on Bone Marrow Derived Macrophage Polarization, Anant Jaiswal, Sukka Santosh Reddy, Preeti Maurya & MK Barthwal
- Induction of Toll like Receptor Pathway, Autophagy and Endothelial dysfunction during diet induced obesity, Preeti Maurya, Santosh Reddy, Anant Jaiswal, Manoj Kumar Barthwal
- Comparative study of apocynin and diapocynin effect on foam cell formation in THP-1 macrophage, A Kumar, M Rana, P Gupta, H Chandasana, YS Chhonker, RS Bhatta and MK Barthwal
- Photogedunin, a compound from *Xylocarpus granatum* inhibits adipogenesis by arresting Mitotic Clonal Expansion, Abhishek Gupta, Kripa Shankar, Salil Varshney, Sujith Rajan, Ankita Srivastava, Durgesh Kumar, T Narender and Anil N Gaikwad
- Design and Development of Pyranone Derived Novel Fluorescent Probes for Chemosensing and Bio-Imaging Applications, Shahida Umar, Ajay kumar Jha, Ashutosh Sharma and Atul Goel
- Design and synthesis of new functionalized Biphenyls and Pyranones as potent Antihyperglycemic agents, Shachi Mishra, Pallavi Awasthi, AK Srivastava, A Gaikwad, SK Rath and Atul Goel
- Synthesis, Enantiomeric Resolution and Bone anabolic activity of Medicarpin and 9-Demethoxy Medicarpin, Chandra Prakash Gupta, Deepak Purohit, Ashutosh Raghuvanshi, Divya Singh and Atul Goel
- Antimalarial activity of newly synthesized indole derivatives against chloroquine resistant and sensitive strains of *Plasmodium falciparum,* Bhavana Singh Chauhan, N Devender, RP Tripathi and Renu Tripathi
- Arteether- Vitamin D co-treatment attenuates experimental cerebral malaria, Hemlata Dwivedi, Sunil Kumar Singh and Renu Tripathi
- Exploration of mechanism involved in synergistic interaction of mefloquine and clarithromycin, Sarika Gunjan, Hafsa Ahmad, Anil Kumar Dwivedi and Renu Tripathi
- Effect of arteether on histamine receptors with late stage cerebral malaria, Sunil Kumar Singh, Hemlata Dwivedi and Renu Tripathi
- Dynamics of host antigen-presenting cells during early stages of Brugia malayi infective larvae stage 3 (Bm-L3) infection, Aditi Sharma, Pankaj Sharma and Mrigank Srivastava
- Role of Eosinophils during filarial manifestation of Tropical Pulmonary Eosinophilia, Pankaj Sharma, Aditi Sharma and Mrigank Srivastava
- *Plasmodium* Stearoyl-CoA Δ 9-desaturase is important for the late liver stage development or initiation of blood stages, SK Narwal, HH Choudhary, R Gupta, A Ghosh, KA Kota and S Mishra
- Asporozoite transmembrane protein-PbS14 produced by oocyst sporozoites facilitates commitment of sporozoites to invade *Anopheles stephensi* salivary glands. A Ghosh, SK Narwal, R Gupta, HH Choudhary, SK Kolli, KA Kota and S Mishra
- *Plasmodium* SufS mediates multiple biological roles during parasite development in *Anopheles stephensi*and mammalian host, HH Choudhary, M Charan, R Gupta, KA Kota, S Habib and S Mishra
- *In vitro* susceptibility of Indian field isolates *of Plasmodium falciparum to* standard antimalarials and antibiotics, Pooja Agarwal and Kumkum Srivastava
- Synthesis and Antimalarial Activities of Chalcone-Coumarin Hybrid molecules and other derivatives, Nitin H Andhare, Yogesh Thopate, Kumkum Srivastava and Arun K Sinha
- Assessing organelle specific folding of metastable sensor and perturbing their folding capacity through small molecules, R Sharma, M Pramanik, N Rastogi, and N Kumar
- *Wolbachia* transcription elongation factor (Wol GreA) ubiquitously present in *B. malayi* life-stages: C-terminal domain imparts chaperone like activity while N-terminal domain interacts with DNA., Dhanvantri Chahar, Jeetendra Kumar Nag, Anshul Chawla, Arindam Bhattacharjee, Tanuj Sharma, Kalyan Mitra, Mohammad Imran Siddiqi, Shailja Misra-Bhattacharya
- Immune responses of bancroftian patients to *Brugia malayi* trehalose-6-phosphate phosphatase and heavy chain myosin, Ruchi Jha, Mamta Gangwar, Dhanvantri Chahar, Setty Balakrishnan Anand and Shailja Misra- Bhattacharya
- Trehalose-6-phosphate-phosphatase of *Brugia malayi shows promise as* antifilarial vaccine candidate, Susheela Kushwaha, Prashant Kumar Singh, Nidhi Srivastava, Mamta Gangwar, Prabhat Ranjan Mishra & Shailja Misra-Bhattacharya
- Pharmacokinetic Drug Interaction Potential of Dihydroartemesinin-DesbutylLumefantrine Combination, MohdYaseen Malik, Balveer Ram, KSR Raju, Isha Taneja, Mamunur Rashid and Wahajuddin

- Dose dependent preclinical pharmacokinetic studies of CDRI molecule S007-1500, Mamunur Rashid, Isha Taneja, KSR Raju, Sandeep K Singh, and Wahajuddin
- LC-ESI-MS/MS method development for bioanalytical determination of S007-1500 and its application to *in vitro* pharmacokinetic studies, Kripal Bhalala, Isha Taneja, KSR Raju, Sandeep K.Singh, Mamunur Rashid and Wahajuddin
- *In vitro* and *in vivo* pharmacokinetic assessment of novel anti-osteoporosis CDRI molecule S011-1793, Sandeep K Singh, Isha Taneja, KSR Raju, Mamunur Rashid and Wahajuddin
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- Extract and fraction from *Ulmus wallichiana* attenuates DOCA-salt-induced and spontaneously hypertensive rats, Anees A. Syed, Shibani Lahiri, Divya Mohan, Sudhir Kumar, Kashif Hanif, Jiaur R Gayen
- *In-vitro* preclinical pharmacokinetic studies of novel anti-tumor CDRI candidate molecules S009-131 & S011-1992, Mohammed Riyazuddin, Minakshi Shukla, Ravithej Singh, Jayanta Sarkar, K V Sashidhara and Jiaur R Gayen
- LC-MS/MS using electrospray ionization for bioanalytical method validation of S009-0629 in rat plasma and its application to preclinical pharmacokinetic study, Guru R Valicherla, Kishan S Italiya, Sandeep K Singh, Sudhir Shahi, Anand P Gupta, Atul Goel, Jiaur R Gayen
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- *In-vitro* and *in-vivo* pharmacokinetics of S012-1965, a potent anti-diabetic compound, M Shukla, MY Malik, S Jaiswal, KKG Ramakrishna, RP Tripathi, J Lal
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- HMGB1 Sumoylation mutation alters TLR 4 interaction during cytokines mediated signaling, Dipika Goyal, Himalaya Singh, Kumaravelu Jagavelu
- MAPKAPK2 regulates the lipopolysacharide mediated Endothelial Microparticle generation, Dipti Tripathi, Bharti Biswas, Amit Manhas, Kumaravelu Jagavelu,
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- Acetyl-L-carnitine enhances neuronal survival and improves cognitive functions via up-regulation of dopamine D1 receptor and glutamate transporter-1 in the hippocampus of Parkinson's disease, Akanksha Mishra, Sonu Singh, Shubha Shukla
- ALCAR Protect dopaminergic neurons and exerts pro-neurogenic effect by inhibition of glial activation on and oxidative stress in Parkinson disease, Neha Srivastava, Sonu Singh, Akanksha Mishra, Shubha Shukla
- Inducible nitric oxide synthase potentiates imatinib induced cell cycle arrest and apoptosis in leukemic cell line, Deepika Awasthi, Abhishek Kumar Singh, Megha Dubey, Sheela Nagarkoti, Manoj Kumar Barthwal and Madhu Dikshit
- Neutrophils efficiently kill microbes by phagocytosis through augmenting ROS and NO generation, Sheela Nagarkoti, Abhishek Kumar Singh, Megha Dubey, Deepika Awasthi, Samreen Sadaf, Kumarvelu Jagavelu and Madhu Dikshit
- CDR-267-F018 ameliorates hyperlipidemia and associated deleterious effects on the liver of ApoE KO mice, JS Kanshana, SC Rebello, P Pathak, K Nageswararao, MN Srivastava, T Narender, AK Dwivedi, Kumaravelu J, MK Barthwal and M Dikshit
- Metabolic status of inducible nitric oxide synthase knockout mice fed on various calorie diets, Nageswararao Kanuri, Jitendra S Kanshana, Priya Pathak, Sanjay C Rebello, Anand P Gupta, Jiaur R Gayen, Kumaravelu J, Manoj K Barthwal and Madhu Diskhit
- Influence of insulin resistance on acetylcholine induced vasorelaxation following high fat diet feeding in inducible nitric oxide synthase knockout and wild type mice, Priya Pathak, Jitendra S Kanshana, Sanjay C Rebello, Nageswararao Kanuri, MK Barthwal, J Kumaravelu and Madhu Diskhit
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- Rapid quantitative analysis of multicomponents in *Andrographis paniculata* using ultra high

performance liquid chromatography coupled with triple quadrupole mass spectrometry: Application to soil sodicity and organic farming, Preeti Chandra Renu Pandey and Brijesh Kumar

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- UPLC-QqQLIT-MS/MS based rapid, sensitive and validated method for simultaneous identification and quantitation of six potential osteogenic agents in different parts of *Butea monosperma* (syn *Butea frondosa*), Vikas Bajpai, Awantika Singh, Khushbu Sharma, Mahendra Sahai, Rakesh Maurya and Brijesh Kumar
- NMR-based Metabolomic approach to explain the tissue specificity and seasonal variation of the alkaloids in *Alstonia scholaris*, Rohit Mahar, DK Mishra, Sanjeev K Shukla
- Ultrastructural and physiological effects of an orally active clerodane diterpene in *Leishmania donovani*, Bhanu Priya Awasthi, Manoj Kathuria, Arindam Bhattacharjee, Koneni V Sashidhara, Suriya Pratap Singh, Kalyan Mitra
- Ultrastructural and physiological effects of an orally active clerodane diterpene in *Leishmania donovani*, Bhanu Priya Awasthi, Manoj Kathuria, Arindam Bhattacharjee, Koneni V Sashidhara, Suriya Pratap Singh, Kalyan Mitra
- Expression of Germ Cell Maturation Markers in HPV Positive Cervical Cancers can be Therapeutic Targets, A Jain, SK Agnihotri, AK Agarwal, BA Hakim, MLB Bhatt, R Sachan, M Sachdev
- Effect of Chebulinic Acid on Male Reproductive System, AK Agrawal, SK Agnihotri, BA Hakim, D Singh, M Aggrawal, MC Tiwari, R Sachan, T Narender & M Sachdev
- Implication of Oocyte Maturation Markers during Ovarian Failure in Mouse Model, BA Hakim, A Nath, SK Agnihotri, AK Agrawal, A Jain, D Singh, S Maurya, R Konwar & M Sachdev
- Redundancy of cytosolic kinases of mycobacteria is reliant on selective phosphorylations of some common substrates, Sameer Tiwari, Shivraj Yabaji, Richa Saxena, K Pramod
- Protein tyrosine kinase A phosphorylates PtpA and augments its secretion, which further leads to enhanced intracellular survival of mycobacteria, Swati Jaiswal, Aditi Chatterjee, Sapna Pandey and Kishore K Srivastava
- Immunoprotective effects of Methoxyisoflavones Formononetin and Iso-Formononetin promote Osteogenesis in Estrogen deficient bone loss conditions, Mohd Nizam Mansoori, Abdul Malik Tyagi, Priyanka Shukla, Kamini Srivastava, Kapil Dev, Raju Chillara, Rakesh Maurya, Divya Singh
- A novel synthetic pterocarpan S015-972 promotes osteoblast differentiation and prevents Estrogen deficiency induced bone loss, Priyanka Shukla, Aushutosh Raghuvanshi, Mohd Nizam Mansoori, Atul Goel, Divya Singh
- A combination of isoflavonoids (MIF) isolated from *Butea monosperma* extract is more effective than the standardized fraction in promoting new bone formation and positively effects various bone parameters in growing Sprague dawley rats, Krishna Bhan Singh, Abnish K Gautam, Rakesh Maurya, Atul Goel, Divya Singh

Emerging Trends in Biological Sciences at Aligarh

- A study on the role of Fatty acid Synthase in right ventricle hypertrophy associated with pulmonary hypertension: Emerging Trends in Biological Sciences, N Singh, I Jahan, K Hanif

251st ACS national meeting on "Computers in Chemistry" organized by American Chemical Society, San Diego, California, USA (13-17March)

- Design and synthesis of novel coumarin analogues by mannich type reaction for spermicidal and anti microbial actions: a dual approach for contraception, Swati Gupta, Bhavna Kushvaha, Gopal Gupta, Anil Kumar Dwivedi

International Society on Optics within Life Sciences (OWLS 2016), Mumbai (16-19 March)

- Donor-Acceptor Based Pyranone Derived Fluorescent Dyes for OLEDs, Bioimaging and Chemosensing Applications, Ajay Kumar Jha, Ashutosh sharma, Shahida Umar, Monika Sachdev, Aamir Nazir , Kalyan Mitra, RS Anand and Atul Goel

8th NIPER CSIR CDRI Symposium on Current Trends in Medicinal Chemistry & Pharmaceutical Sciences in Drug Discovery, NIPER- Rae Bareli (18-19 March)

- Coumarin-Chalcone hybrid, S011-1992- A novel anticancer CDRI drug candidate: Development & Preclinical assessment, Minakshi Shukla, Mohammed Riyazuddin, Ravithej Singh, Jayanta Sarkar, K V Sashidhara and Jiaur R Gayen
- A reversed phase high performance liquid chromatography method development and

validation for the quantification of novel anti-cancer chalcone cardamonin in rat plasma and application to plasma protein binding study, R Goyani, DK Tanpula, S Jaiswal, M Shukla, J Lal

- Pre-clinical Pharmacokinetic Study of S013-1632, a novel anti-Benign Prostatic Hyperplasia (BPH) compound using LC-MS/MS, DK Tanpula, R Goyani, M Shukla, S Jaiswal, S Gupta, VL Sharma, J Lal
- Novel N-alkyl Maleimide Derivatives as Spermicidal Agents: Design and Synthesis, Ashish Kumar Thakur**,** DhanarajuMandalapu, BhavanaKushwaha, JP Maikhuri, Gopal Gupta, VL Sharma

National Conference on Advances in Cancer Therapeutics -2016 (ACT-2016), CSIR-IICT, Hyderabad, (4-5 April)

- Beta peptide as inhibitors for the stat protein NTD, Pancham Singh, Ravi Sankar Ampapathi

IMMUNOLOGY 2016- AAI meeting, Seattle, Washington, USA (13-17 May)

- iNOS over expression reduces K562 cell proliferation and promotes neutrophilic differentiation, Deepika Awasthi, Abhishek Kumar Singh, Megha Dubey, Sheela Nagarkoti, Manoj Kumar Barthwal and Madhu Dikshit

International conference on Materials Engineering and Nanotechnology, Taipei, Taiwan (20-22 May)

- Donor-Acceptor Pyranone-derived Fluorescent Compounds for Organic Electronic Devices and Cell Imaging, Atul Goel

International Conference on Electron Microscopy, Varanasi (02-04 June)

- Ormeloxifene, a selective estrogen receptor modulator, induces autophagy-associated apoptosis through activation of ER Stress in ovarian cancer *in vitro*, Arindam Bhattacharjee, Mohammad Hasanain, Manoj Kathuria, Jayanta Sarkar, Kalyan Mitra
- Ultrastructural and Physiological studies on the anti-proliferative effects of Plumbagin in *Leishmania donovani*, Manoj Kathuria, Bhanu Priya Awasthi and Kalyan Mitra
- Ultrastructural and Physiological Effects of HSP90 inhibitor Gedunin in ovarian cancer cells, Rohit Sahai, Arindam Bhattacharjee, P Sukanya, Sabbu Satish, T Narender, Kalyan Mitra

25th Annual Meeting of the Population Approach Group in Europe (PAGE-2016), University of Lisbon, Portugal (07-10 June)

- Pharmacokinetic-Pharmacodynamic modeling of miltefosine in *Leishmania donovani* infected Golden Syrian Hamsters, S Jaiswal, TPC Dorlo, M Shukla, A Sharma, B Tiwari, N Goyal, J Lal

11th International ISSX Meeting, Busan (12-16 June)

- Assessment of dose- and time- dependent effects of 16-dehydropregnenolone on rat hepatic phase-I drug metabolizing enzymes, Rachumallu Ramakrishna, Manisha Bhateria, Rajbir Singh, Rabi Sankar Bhatta

19th CRSI National Symposium in Chemistry, University of North Bengal, Siliguri (14-16 July)

- Donor-Acceptor Fluorescent Compounds for Organic Electronic and Cell Imaging Applications, Atul Goel

39th Annual Meeting of the Japanese Neuroscience Society, Yokohama, Japan (20-22 July)

- Phytosomes of NMITLI118RT+: A prudent therapeutic approach for favorable outcomes in ischemic injury, Hafsa Ahmad, Abhishek Arya, Satish Agrawal, Rakesh Shukla, Anil Kumar Dwivedi

Alzheimer's Association International Conference (AAIC), 2016, Toronto, Canada (24-28 July)

- Chronic Dizocilpine (MK801) potentiates memory: A paradoxical mechanism, Chandan Sona, Alok Tripathi, Prem Narayan Yadav

1st Conference of SSX, Indian Society for the Study of Xenobiotics, IISC, Bengaluru (01-03 September)

- Investigation of effect of Biochanin A on the pharmacokinetics Profile of Docetaxelusing validated LC-MS/MS method, Sandeep K Singh, Mamunur Rashid, KSR Raju, MohdYaseen Malik, Swati Chaturvedi, Sadafjahan and Wahajuddin
- Preclinical pharmacokinetic studies of a novel anti-cancer compound, S007-1235, S Jaiswal, A Sharma, M Shukla, T Akhtar, A Kumar, J Lal
- Pharmacokinetic-pharmacodynamic modeling of furosemide in spontaneously hypertensive and DOCA-salt induced hypertensive rats, M Shukla, S Jaiswal, A Sharma, M Jain, K Hanif, J Lal

Malaria Parasite Biology: Drug Designing & Vaccine Development, Ahmedabad (9-10 September)

- Functional characterization of *Plasmodium berghei* Nicotinamidase (nic) by reverse genetics approach, SR Reddy, SK Kolli, D Singh, M Mulaka, S Mishra, KA Kumar

AS-UoH Joint Workshop on Frontiers in Life Sciences, Hyderabad (16-17 September)

- Role of *Plasmodium berghei* nicotinamidase in transmission stages of malaria: Implications for developing anti-malaria transmission blocking drugs, SR Reddy, SK Kolli, D Singh, M Mulaka, S Mishra, KA Kumar

24th International Conference on Bioencapsulation, Lisbon, Portugal (21-23 September)

- Improved efficacy of bicalutamide by co-delivery of hesperetin in prostate cancer, Abhishek Arya, Hafsa Ahmad, Satish Agrawal, Anil Kumar Dwivedi

6thIndo-Japanese International Symposium, on Overcoming Intractable Infectious Diseases Prevalent in Asian Countries, Goa (23 & 24 September)

- Use of Drug delivery systems in experimental filariasis, Shailja Misra-Bhattacharya
- Pincer therapeutics: targeted delivery of a single molecule for host-directed and bactericidal therapy in a mouse model of tuberculosis, Anuradha Gupta, Deepak Sharma, Sanket Kumar Pandya, Rajeev Ranjan, Pushpa Gupta, Umesh Dutta Gupta, Sadan Kumar, Sharad Sharma, Amit Misra

Brain Conference on New Insights into Psychiatric Disorders thorough Computational, Biological and Developmental Approaches, Copenhagen, Denmark (25-28 September)

- Cross-talk between Kappa opioid receptor and NMDA: Implication in refractory depression in mice, Shalini Dogra, Ajeet Kumar, Prem N Yadav

Trends in Biomedical Research (Felicitation of Prof. G P Talwar, NII Founder Director, on his 90th birthday), New Delhi (2-4 October)

- Pincer movement against *M. tuberculosis* infection using a molecule that induces host macrophage autophagy and has moderate anti-tuberculosis activity, Anuradha Gupta, Deepak Sharma, Sanketkumar Pandya, Rajeev Ranjan, Pushpa Gupta, Umesh Dutta Gupta, Sadan Kumar, Sharad Sharma, Amit Misra

International Conference on applicability of genomic technologies, Lucknow (13 October)

- Dissecting Cancer genome with modern tools, Srikanta Kumar Rath

International Conference on Cell Biology of Infections. National Centre for Biological Sciences, Bengaluru, (13-14 October)

- Plasmodium berghei S14 is Essential for Gliding Motility and Infectivity of Sporozoites, A Ghosh, SK Narwal, R Gupta, HH Choudhary, SK Kolli, KA Kumar, S Mishra
- Probing the function of Aspartyl proteases, Plasmepsin VII & VIII in *Plasmodium berghei*, BS Mastan, SK Narwal, S Dey, S Mishra, KA Kumar
- Modulation of host cell SUMOylation facilitates efficient infection of *Plasmodium berghei* and *Toxoplasma gondii*, M Mulaka, D Singh, SR Reddy, BS Mastan, S Mishra, KA Kumar
- Role of *Plasmodium berghei* nicotinamidase in transmission stages of malaria: Implications for developing anti-malaria transmission blocking drugs, SR Reddy, SK Kolli, D Singh, M Mulaka, S Mishra, KA Kumar
- Evaluation of rhamnolipid producing ability of *Pseudomonas strains* and analysis of their antibacterial activity Alok K Mishra, Rikesh K Dubey, Shivraj M Yabaji, Dinesh K Tripathi and Kishore K Srivastava
- Non-Aspartate Phosphorylation of *Mycobacterium tuberculosis* Response Regulator PrrA, Alok K Mishra, Rikesh K Dubey, Shivraj M Yabaji, Dinesh K Tripathi and Kishore K Srivastava

National Conference on Recent trends in Biotechnology, Chennai (19-21 October)

- Biotechnology for health care and the challenges, Srikanta Kumar Rath

BioQuest, Hyderabad, (20-21 October)

- Role of *Plasmodium berghei*nicotinamidase in transmission stages of malaria: Implications for developing anti-malaria transmission blocking drugs, SR Reddy, SK Kolli, D Singh, M Mulaka, S Mishra, KA Kumar

12th USA AAPS Annual Meeting and Exposition, Colorado Convention Center, Denver, (13-17 November)

- Evaluation of the mechanism behind bioenhancing potential of lysergol, J Lal, M Shukla, MY Malik, S Jaiswal, A Sharma, DK Tanpula, R Goyani
- Comparative *in vitro* and *in vivo* pharmacokinetic evaluation of natural product inspired quinazolinoneantileishmanials, J Lal, A Sharma, S Jaiswal, M Shukla, M Sharma, PMS Chauhan
- A novel self-nanoemulsifying lipid carrier system for enhancement of anticancer activity of curcumin, M Shukla, S Jaiswal, A Sharma, A Arya, AK Dwivedi, J Lal

- Novel self-emulsifying drug delivery system bearing paclitaxel for improved bioavailability and anticancer therapy, Jaya Gopal Meher, Darshad Khan Pathan, Manish K Chourasia
- Stereoselective Inhibition of Cytochrome P450 2B6 by a Novel Antithrombotic Agent, S002-333, in Human Liver Microsomes, Manisha Bhateria, Rachumallu Ramakrishna, SahithiYerrabelli, Rabi Sankar Bhatta

National seminar on "Glimpses of Research Work in Taxonomy and Ethnobotany" at CSIR-NBRI, Lucknow (15 November)

- NMITLI118RT + (A standardized extract of a new chemotype of *Withania somnifera* Dunal) phospholipid complexes: a prudent therapeutic approach for improved functional outcomes in experimental stroke, Hafsa Ahmad, Abhishek Arya, Satish Agrawal, Rakesh Shukla, Anil Kumar Dwivedi
- Establishment of Callus culture, efficient micro-propagation and in-vitro biosynthesis of triterpenoids from leaf derived explants of *Taraxacum officicinale,* Neha Sahu, Saba Irshad, Sayyada Khatoon, Mukesh Srivastava, KR Arya

2nd International Toxicology Conclave 2016, CSIR- IITR Lucknow (15-16 November)

- 6-Hydroxydopamine(6-OHDA) impairs adult hippocampal Neurogenesis and behavioural function via Wnt/ β-catenin signaling : A potential role of MK-801(dizocipline)against 6-OHDA- induced neurotoxicity, Sonu Singh, Akanksha Mishra, Shubha Shukla
- Glycogen synthase (GSK-3â) inhibition enhance mitochondrial biogenesis and dopaminergic Neurogenesis lowered by 6-OHDA induced neurotoxicity in rats, Akanksha Mishra, Sonu Singh, Virendra Tiwari, Soni Jignesh Mohanbhai, Parul, Shubha Shukla

All India Cell Biology Conference & International Symposium on Functional Genomics and Epigenomics, Jiwaji University, Gwalior (17-19 November)

- Sigma Factor and Biofilm formation in mycobacteria: An untold story, Bhupendra N Singh

Innovations in Biological Research on health and disease, Mysuru (21–24 November)

- HIF-1α inhibitor Chetomin induces caspase mediated cell deathin triple negative breast cancer, Jayant Dewangan, Sonal Srivastava and Srikanta Kumar Rath

85th meeting of the Society of Biological Chemists (India), CSIR- CFTRI, Mysore, (21-24 November)

- Characterization of Circular RNA Molecule circzip-2 and its Bio-synthesizing Gene *zip-2* in *C. elegans* Model of age associated Parkinson's Disease, Lalit Kumar, Shamsuzzama and Aamir Nazir
- Parkinson's disease associated pathways may be regulated by miRNA let-7: studies employing transgenic *C.elegans* expressing human α-synuclein, Shamsuzzama, Lalit Kumar, and Aamir Nazir
- Protein Tyrosine "Phosphatome" in *Caenorhabditis elegans* genome: implications in age-associated neurodegenerative disease, Soobiya Fatima, and Aamir Nazir, Age associated neuroprotective effect of sirtuins: Employing transgenic *C. elegans* model expressing human alpha synuclein, TanviBhagel, Soobiya Fatima, Abhishek Singh, PoojaJadiya, and Aamir Nazir

World Congress on Drug Discovery and Development 2016, IISC, Bengaluru (23- 25 November)

- Non-carbonyl *Curcuma Longa* [NCCL] protects heart from myocardial ischemia/reperfusion injury by reducing endothelial microparticle mediated inflammation in rats, Amit Manhas, Dipti Tripathi, Bharti Biswas, Hafsa Ahmad, Dipika Goyal, Anil Kumar Dwivedi, Madhu Dikshit and Kumaravelu Jagavelu

XII J-NOST Conference, CSIR-CDRI, Lucknow, 24-27 November

- β-Carboline-directed regioselectiveortho-C(sp2)-H functionalisations of aryl ring of aryl (β-carbolin-1-yl) methanones, Shivalinga Kolle and S Batra
- Triple-Cooperative Catalysis-mediated synthesis of polycyclic β-Carboline, Venna D Yadav, S U Dighe, R Mahar, S Shukla and S Batra
- Donor-Acceptor Pyranone Derived Fluorescent Dyes for Chemosensing and Live Cell Imaging Applications, Ajay Kumar Jha
- Synthesis, Enantiomeric Resolution and Bone anabolic activity of Medicarpin and S-007-1500, Pallavi Awasthi, Ashutosh Raghuvanshi, Divya Singh and Atul Goel
- Visible Light Photocatalyzed Cross Dehydrogenative Coupling of N-Aryl- 1,2,3,4-Tetrahydroisoquinolines with Diazoenolates, Mr Mukund M D Pramanik

21st International Conference on Organic Synthesis (ICOS-21), IIT, Mumbai (11-16 December)

- Synthesis and synthetic Utility of 3-nitroisoxazole, Sushobhan Mukhopadhyay, D. Barak and S Batra
- Donor-Acceptor Based Pyranone derived Fluorescent Dyes for Bio-Imaging and Chemosensing Application, Shachi Mishra, Ajay K Jha, A Sharma, S Umar, M Sachdev, K Mitra, D Dutta, A Nazir and Atul Goel

40th Annual Conference of Indian Association of Medical Microbiologists, PGIMER, Chandigarh, India (25-27 November)

- Protein Kinase 9 regulates sexual reproduction in Plasmodium: A novel malaria transmission-blocking drug target, SK Narwal, J Togiri, SK Kolli, A Ghosh, HH Choudhary, BS Mastan, SR Reddy, KA Kumar, S Mishra
- Protein Kinase 9 regulates sexual reproduction in Plasmodium: A novel malaria transmission-blocking drug target, SK Narwal, J Togiri, SK Kolli, A Ghosh, HH Choudhary, BS Mastan, SR Reddy, KA Kumar, S Mishra

J-NOST 2016, Lucknow (24-27 November)

- Donor-Acceptor Pyranone Derived Fluorescent Dyes for Chemosensing and Live Cell Imaging Applications, Ajay Kumar Jha
- Synthesis, Enantiomeric Resolution and Bone anabolic activity of Medicarpin and S-007-1500, Pallavi Awasthi, Ashutosh Raghuvanshi, Divya Singh and Atul Goel

Frontiers in Chemical Sciences 2016, Department of Chemistry, IIT-Guwahati (8-10 December)

- Synergistic Catalysis Towards Multicomponent Cascade C-C and C-S/ C-C Bond Formation, Richa Singh, YogeshThopate and Arun K Sinha
- Green synthetic tool for sulfenylation of indoles and hydroxyaryls, Danish Equbal, Saima, Aditya G Lavekar and Arun K Sinha

30th Annual meeting of society of Neurochemistry, India, Hyderabad (9-11 December)

- Next generation of antidepressants- “Kappa Opioids”, Prem N Yadav

21st International Conference on Organic Synthesis (ICOS 2016), Mumbai (11-16 December)

- Donor-Acceptor Based Pyranone derived Fluorescent Dyes for Bio-Imaging and Chemosensing Application, Shachi Mishra, Ajay K Jha, A Sharma, S Umar, M Sachdev, K Mitra, D Dutta, A Nazir and Atul Goel

National Conference on Recent Advances in Biomedical Science:Diagnosis & Research and 2nd Annual Scholar’s Science Meet of SBMLS, Delhi (16 December)

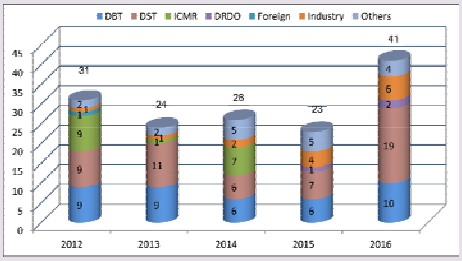
- *In vitro* and *In vivo* Toxicity Evaluation of Di-ethylene glycol monoethyl ether, Sonal Srivastava, Nidhi Gupta, Navodayam Kalleti and Srikanta Kumar Rath

26th Annual Conference of Indian Pharmacological Society, West Bengal branch, Kolkata, (17 December)

- Neuro-protective effects of NMITLI118RT+ via lipid delivery for the therapy of Cerebral Ischemia, Hafsa Ahmad, Abhishek Arya, Satish Agrawal, Rakesh Shukla, Anil Kumar Dwivedi

IISc Symposium on Tuberculosis Research in India, Bengaluru (19 December)

- Inhalable Particles Targeting Lung Macrophages, Rolee Sharma, Pavan Muttil, Awadh B Yadav, Rahul K Verma, Jatinder Kaur, Amit K. Singh, Anuradha Gupta, Mradul Mohan, Atul Agrawal,Sanket Pandya, Rajeev Ranjan, Ashish Srivastava AK Balapure, VK Bajpai, SK Rath, Sharad Sharma, Smriti Bhadauria, Sarika Singh, DS Upadhyay, Vivek Bhosale, Ashim Ghatak, U Mani, BP Chaudhry, RC Murthy, Sudershan K Arora, Himadri Sen, Rakesh Sinha, J Suryakumar, V Modak, R Vineeth; Pushpa Gupta, Umesh D Gupta, Amit Misra



Networks & Linkages

1. Mission Mode Project (FTT)

S N	Code No.	Project Title	Principal Investigator	Date of Start	Expected Date of compilation
1	MLP0103	Anti-osteoporosis Candidate Drug 99/373	Dr Ashim Ghatak	21.07.2016	20.07.2018
2	MLP0104	Anti-malarial Candidate Drug 97/78	Dr Ashim Ghatak	21.07.2016	20.07.2018
3	RSP4040	CSIR Rural Development Activities	Shri Vinay Tripathi	08.11.2016	07.11.2017

2. 12th Plan CSIR Network Projects (2012-2017)

S N	Code No.	Acronym	Project Title	Principal Investigator
1	BSC0201	ASTHI	Anabolic Skeletal Targets in Health and Illness (ASTHI)	Dr Naibedya Chattopadhyay
2	BSC0101	PROGRAM	Factors Governing Competent Gamete Production and Reproductive Dysfunction	Dr Rajender Singh
3	BSC0102	THUNDER	Towards Holistic Understanding of Complex Diseases: Unravelling the Threads of Complex Diseases	Dr Manoj K Barthwal
4	BSC0103	UNDO	New Approaches Towards Understanding of Disease Dynamics and to Accelerate Drug Discovery	Dr S K Rath
5	BSC0104	SplenDID	Emerging and Re-Emerging Challenges In Infectious Disease: System Based Drug Design for Infectious Diseases	Dr R Ravishankar
6	BSC0106	BioprosPR	Bio-prospection of Plant Resources and other Natural Products	Dr Dipak Dutta
7	BSC0108	MEDCHEM	Medicinal Chemistry for Stem Cell Biology and Regenerative Medicines	Dr Atul Kumar
8	BSC0111	INDEPTH	Integrated NextGen Approaches in Health, Disease and Environmental Toxicity	Dr B N Singh
9	BSC0112	NanoSHE	Nano-materials: Applications and Impact on Safety, Health and Environment	Dr Amit Misra
10	BSC0113	UNSEEN	Understanding Supra Molecular Ensembles and Machines	Dr Ashish Arora
11	BSC0114	HOPE	Understanding the Role of Host molecules in Parasitic Infection	Dr Neena Goyal
12	BSC0115	miND	Neurodegenerative Disease: Cause and Corrections	Dr Subha Shukla
13	BSC0118	EpiHeD	Epigenetic in Health and Disease	Dr Amir Nazir
14	BSC0119	HUM	Understanding the Human Microbiome	Dr Arunava Dasgupta
15	BSC0120	Biodiscovery	Centre for Bio-therapeutic Molecule Discovery	Dr J K Ghosh
16	BSC0121	GENESIS	Genomics and Informatics Solutions for Integrating Biology	Dr M I Siddiqui
17	BSC0123	GenCODE	Genome Dynamics in Cellular Organization, Differentiation and Enantiostasis	Dr W Haq
18	CSC0302	ADD	Advance Drug Delivery System	Dr Manish K Chourasia
19	ESC0103	BIOCERAM	Development of Novel CSIR Technology for Manufacturing Tailored and Patient Specific Bio-ceramic Implants and Biomedical Devices at Affordable Cost	Dr P R Mishra
20	ISC0102	KNOWGATE	CSIR Knowledge Gateway and Open Source Private Cloud Infrastructure	Mr. Suman Mallik

3. Grant in Aid Projects

Project Title	Principal Investigator	Date of Start	Expected Date of compilation
Department of Biotechnology			
Solution Structure and Dynamics of Unc-60 ADF/Confilin proteins of Caenorhadbitis elegans	Dr Ashish Arora	24.08.2012	28.05.2016
Drugs against central body fatness and insulin resistance (high peri/post-menopausal prevalence) RGYI	Dr J R Gayen	12.09.2012	10.09.2016

Biotechnological intervention for Pharmaceutically valuable componds from forest resins	Dr Rakesh Shukla	01.05.2013	26.08.2016
Molecular Characterization and Epidemiological Modeling of Antimicrobial resistance at the interface of animal-Human-Plant pathogen Continuum	Dr Rabi Shankar Bhatta	15.04.2013	14.04.2016
Role of miRNAs responsible for bone mass reversal at the time of weaning	Dr Ritu Trivedi	20.05.2013	19.05.2016
Characterization of the role of Human DNA ligase I in Lagging strand DNA synthesis and DNA Replication (RGYI)	Dr Dibyendu Banerjee	10.06.2013	09.06.2016
An Approaches towards identification and synthesis of antigenic epitopes of potential *L.donavani* Th1 stimulatory proteins for the development of synthetic vaccine against Visceral Leishmanisis	Dr A A Sahasrabuddhe	20.06.2013	19.06.2016
Elucidating the role of P53 and DNA damage response pathway in anti-cancer activity of a novel coumarinchalcone hybrid	Dr Jayanta Sarkar	20.06.2013	19.06.2016
Studies on effect of different herbal preparation on wound healing and angiogenesis	Dr Syed Musthapa M	15.07.2013	14.07.2016
Discovering antimalarials from marine organisms (Phase III) : Bulk recollection of promising marine organisms – isolation, purification, characterization and chemical synthesis of marine derived antimalarial	Dr A K Sinha	01.04.2012	31.03.2015
Genetic manipulation and drug targeting approaches against Plasmodium berghei sporozoite proteins S14, Serine threonine protein Kinase -9 and Liver stage specific Acyl - CoA Synthase	Dr Satish Mishra	10.10.2013	09.10.2018
Investigating the extra-ribosomal functions of ribosomal proteins during stree and infection	Dr Niti Kumar	13.11.2013	12.11.2018
Asembly of Iron-Sulphur [Fe-S] Cluster on critical proteins of the plasmodium apicoplast	Dr Saman Habib	11.10.2013	10.10.2018
Discovery and development of novel bone anabolic agents for accelerated fracture healing	Dr Naibedya Chattopadhyay	21.02.2014	21.02.2016
Identification and functional characterization of novel microRNA Candidates altered byphytoestrogen medicarpin: Role in the pathogenesis of osteoporosis	Dr Divya Singh	01.08.2014	31.07.2017
Studies on the interactions between mycobacteria and host defence peptides	Dr Mukesh Pasupuleti	01.10.2014	30.09.2017
miRNA in the regulation of sclerostin, a therapeutic approach for osteoporosis	Dr Sharmishtha Bhattacharya	26.09.2014	25.09.2017
Exploration of Interleukin 1 receptor associated kinase (IRAK) family of kinases during macrophage foam cell formation and inflammation.	Dr Manoj Kumar Barthwal	22.10.2014	22.10.2017
Molecular and biochemical characterization of chaperonin class of heat shock proteins of Leishmania donovani,their exploration as drug target	Dr Neena Goyal	24.12.2014	23.12.2017
Quest for corannulene based polyfunctional molecules in nanobiotechnology and nanomedicine: Transporting and translocating properties of corannulene derived carrier systems	Dr Gautam Panda	24.03.2015	23.03.2018
Profiling and characterization of early phase differential mi-RNA(s) responsible for downstream development of insulin resistance in Hmsc derived-adipocytes	Dr Anil N Gaikwad	28.04.2015	27.04.2018
Tissue specific transcripts and cardical glycoside profiling of calotropis plant after different biotic and abiotic elicitor	Dr Vineeta Tripathi	20.04.2015	19.04.2018
Mechanistic studies on napthaquinone based anticancer agents in breast cancer	Dr Durga Prasad Mishra	29.07.2015	28.07.2018
Understanding the role of Poly (ADP-ribose) polymerase on tight junctions functioning during carcinogenesis	Dr Jyotika Rajawat Mentor: Dr DP Mishra	16.04.2015	25.09.2016
Design, development and performance evaluation of hybrid systems comprising novel cationic lipids intended to deliver therapeutic siRNA to solid tumors	Dr Manish K Chourasia	15.02.2016	14.02.2019
Mesenchymal stem cells with a polymeric scaffold may improve cardiac function in a mouse myocardial model	Dr Madhu Dikshit	03.05.2016	02.05.2018
Induction of autophagy as a strategy for treatment of tuberculosis	Dr Amit Misra	01.06.2016	31.05.2019

Deciphering the roles of secreted proteases in host-Mycobacterium tuberculosis interaction: Implications for novel drug discovery and vaccine development	Dr Arunava Das Gupta	13.07.2016	12.07.2020
RhoA GTPase in neutrophil chemotaxis and functions during inflammation	Dr Sachin Kumar	31.05.2016	30.05.2021
Development of Tocopherol succinate anchord nano-constructs bearing paclitaxel for synergistic efficacy against bone metastatic breast cancer : crosstalk between breast cancer and bone	Dr PR Mishra	29.07.2016	28.07.2017
Induction of mitochondrial cell death and reversal of anticancer drug resistance via multifunctional immunotherapeutic nano emulsion	Dr Manish K Chourasia	03.10.2016	02.10.2019
Understanding the role of RBR-E3 Ubiquitin ligase in P. falciparum and exploring its potential for Pharmacological intervention	Dr Niti Kumar	08.11.2016	07.11.2019
Evaluation of TGF-β mediated signalling mechanism in the endometriosis using mouse model	Dr Rajesh Kumar Jha	08.11.2016	07.11.2019
Synthesis and antiparasitic activities of quinoline-tetrahydropyrimidine hybrids with special reference to anti-malarial, anti-leishmanial and anti-filarial activities	Dr Renu Tripathi	13.10.2016	12.10.2019

Project Title	Principal Investigator	Date of Start	Expected Date of compilation
Department of Science & Technology			
Sophisticated Analytical Instrument Facility (SAIF)	Director	01.04.1975	Long Term
Understanding the mechanism of anti-carcinogenic effect of alpha-solanine	Dr Jayanta Sarkar	01.10.2012	30.09.2015
Exploration of potency, efficacy and mode of action of Ulmus wallichiana against hypertension	Dr J R Gayen	01.10.2012	30.09.2015
Evaluation of weak dipole dipole interactions in molecular solids by means of experimental charges density studies and computational methods	Dr T S Thakur	07.11.2012	06.11.2015
Role of estrogen(s) induced redox alterations in breast carcinogenesis	Dr Smrati Bhadauria	01.01.2013	31.12.2016
Role of integrin 8-Fas and FAK signaling in the endometrial epithelial cell physiology during uterine tissue remodeling process	Dr Rajesh Kumar Jha	27.02.2013	26.02.2016
Functional Characterization of fission yeast cleavage and polyadenylation factor subunit RNA 14 and its implication on cell cycle checkpoint pathway	Dr Shakil Ahmed	15.03.2013	14.03.2016
Identification and characterization of small molecule inhibitors of human DNA ligases as potential anti-cancer agents	Dr Dibyendu Banerjee	03.06.2013	02.06.2016
Molecular dissection of signal transduction events involved in host defence against experimental visceral leishmaniasis	Dr Susanta Kar	20.06.2013	19.06.2016
Deciphering the role of Ccr4-Not complex in human malaria parasite Plasmodium falciparum	Dr Manish Goyal	10.06.2013	09.06.2018
Therapeutic evalution of fetal osteo-progenitor stem cell in rat model of osteoporosis	Dr Deepsikha Tewari	30.07.2013	29.07.2016
Deconstructing Corticostriatal Circuit: Implication in Executive function	Dr Prem N. Yadav	01.11.2013	31.04.2017
Tyrosine hydroylase as potential drug target in Parkinson's disease: studies with genetic knockdown model of caenorhabditis elegans	Dr Aamir Nazir	01.11.2013	31.10.2016
Clonal multiplication of Indian traditional plant ulmus wallichiana Planchon: An endangered tree for healing fracture	Dr K R Arya	17.10.2013	16.10.2015
Qualitative and Quantitative analysis of bioactive alkaloida in Berberis and Mahonia species and use of PCA for marker identification	Dr Brijesh Kumar	17.10.2013	16.10.2015
Probing electrophilic cyclization of alkynols and alkylamines for the synthesis of various heterocyclic compounds	Dr Maddi Sridhar Reddy	02.12.2013	01.12.2016

Identification of drug targets in helicobactor pylori using dual-tagged carbohydrates	Dr Pintu Kumar Mandal	01.03.2014	28.02.2017
Target oriented delivery of chemotherapeutiv agent in leishmanisasis via macrophage scavenger receptors	Dr Manish K Chourasia	01.06.2014	31.05.2017
Exploring the potemtial of heterodienophile in Hauser.kraus annulations	Dr Namrata Rastogi	01.06.2014	31.05.2017
Investigations on the immunomodulatory properties of cyclic and linear host defence peptides	Dr Mukesh Pasupuleti	10.07.2014	09.07.2017
Development of catalytic asymmetric fluorination and fluorocyclization reactions	Dr Kishore Mohanan	01.08.2014	31.07.2017
Development of novel strategies towards the synthesis of N-Heterocycles using isocyanide based multicomponents reaction	Dr PMS Chauhan	15.05.2014	14.05.2017
Molecular and functional characterization of MAP Kinase1 homologue of Leishmania donovani	Dr Neena Goyal	01.01.2015	31.12.2017
RNAi mediated functional analysis of biomarkers for endometrial receptivity	Dr Rohit Kumar	06.04.2015	05.04.2018
Development of sugar amino acid derived peptides self assembling selectively on bacterial membranes, forming ion pores and killing bacteria including MTB	Dr Rs Ampapathi & Dr Vinita Chaturvedi	20.05.2015	19.05.2018
Skeletal effect of stimulation of receptor activator of NF-Kb ligand(RANKL) from osteoblast by theophylline and the mechanism of action of the drug	Dr Naibedya Chattopadhyay	03.06.2015	02.06.2018
E3 ubiquitin ligases in breast cancer: Identification of novel interacting proteins of E3 ubiquitin ligase E6AP from breast cancer cells	Dr Arun Kumar Trivedi	03.06.2015	02.06.2018
Design and development of plants secondary metabolite LC-MS/MS library to explore the chemistry of medicine plants	Dr Sanjeev Kanojiya	01.10.2015	30.09.2018
Original biocompatible phosphorus dendrimers as a new strategy to tackle pulmonary tuberculosis	Dr K K Srivastava	16.11.2015	15.11.2018
In vivo studies of GIT enzyme resistance insulin compound	Dr J R Gayen	04.01.2016	04.01.2018
Design and synthesis of natural, un-natural analogues of calothrixins A,B and evaluation of antimalarial and anticancer activity	Dr Kumkum Srivastava	12.01.2016	11.01.2019
Do transmembrane protein kinase PERK, IRE1 and activation transcription factor 4 and 6 (ATF4 & 6) are involved in neuronal death?	Dr Sarika Singh	07.04.2016	06.04.2019
Assessment of the toxicity potential of anabolic-androgenic steroids: a toxicogenomic and proteomic approach	Dr Prabhash Kumar Pandey Mentor: Dr SK Rath	18.04.2016	17.04.2016
Activity guided isolation of anticancer agents from Indian medicinal plants and synthetic modifications of major bioactive constituents	Dr Rashmi Gaur Mentor: Dr K V Sashidhara	01.02.2016	31.01.2018
Receptor mediated co-delivery of anticancer drug and siRNA to overcome multidrug resistance in breast cancer	Dr Lipika Ray	02.06.2014	01.06.2017
Functional evaluation of miRNA regulators during early embryonic development of mice	Dr Amar Nath Mentor: Dr Monika Sachdev	01.04.2016	31.03.2018
Protective effect of topical application of celecoxib and/or n-acetyl cysteine on deoxynivalenol; mycotoxin induced skin inflammation,genotoxicity and tumorigenecity in mice	Dr Sakshi Mishra Mentor: Dr SK Rath	01.07.2016	30.06.2019
Investigation of uptake and efflux transporters role in first line prescription medicines and CDRI candidate drug disposition, potential drug combination and pharmacological effects by experimental therapeutic studies	Dr Sadaf Jahan Mentor: Dr Wahajuddin	15.03.2016	14.03.2018
Modulation of systemic immune response and pathology in DBA-1 mouse model of rheumatoid arthritis by *Fasciola gigantic*-derived immunomodulatory proteins (IMP)	Dr Yasir Khan Mentor: Dr Naibedya Chattopadhyay	16.03.2016	15.03.2018

Enantioselective Organocatalysis: A novel approach to use acetal as pro-nucleophile and hydroxylactam as pro-electrophile via co-oerative catalysis	Dr Dipankar Koley	27.09.2016	26.09.2019
Targetting the DnaG-DnaB interaction in Mycobacterium tuberculosis to identify and validate suitable small molecule inhibitors	Dr Y K Manju	28.09.2016	27.09.2019
Application of common vegetables derived fluorescent carbon nanoparticles in in-vivo multianalyte sensing	Dr Vikram Singh Mentor: Dr Atul Goel	11.08.2016	10.08.2018
Dissecting the role of Drp1, a Rint1 family protein during DNA damage response and its implication on cell cycle checkpoint pathway in fission yeast *S.pombe*	Dr Shakil Ahmed	30.09.2016	29.09.2019
Adipocyte biology and insulin resistance: Metabolic homeostasis using naturally occurring bio-active/dietary lipids	Dr Anil N Gaikwad	27.09.2016	26.09.2019
Isolation, characterization of novel antimalarial compounds from potent Indian medicinal plants which being practicised by various Indian Tribes against malaria and evaluating the efficacy of their combination against drug resistant *Plasmodium falciparum* as an excellent alternative drug	Dr M Nagarajan Mentor: Dr Sanjeev K Shukla	01.09.2016	31.08.2018
Synthesis and characterization of hydroxyapatite nano drug vehicles for effective drug delivery and their *in-vitro* / *in –vivo* studies in bone	Dr Vijay Kumar Mishra Mentor: Dr Ritu Trivedi	14.07.2016	13.07.2018
Quest for druuggable targets against filarial manifestation of Tropical Pulmonary Eosinophilia (TPE): a mass spectrometry based global proteome analysis of eosinophilia	Dr Mrigank Srivastava	30.12.2016	29.12.2019
Decarboxylative cross couplings en route to the synthesis of heterocycles.	Dr Sanjay Batra	04.01.2017	03.01.2020
Identification of shikimate kinase as a drug target against Mycobacterium tuberculosis	Dr Sapna Pandey Mentor: Dr KK Srivastava	16.01.2017	15.01.2020

Project Title	Principal Investigator	Date of Start	Expected Date of compilation
Indian Council of Medical Research			
Designed synthesis and biological evaluation of novel agents for managements design prostatic hyperplasia	Dr V L Sharma	01.12.2012	30.11.2016
Evaluation of rescue treatment for cerebral malaria *in vitro* / *in vivo* model	Dr Renu Tripathi	21.11.2013	20.11.2016
Design synthesis, evaluation and identification of novel dually effective spermicidal agents with-trichominal activity for prophylactic contraception	Dr Gopal Gupta	01.04.2014	31.03.2017
Validation of WNT pathway modulation and efficacy study in primary osteoporosis, fracture healing and secondary osteoporosis for repositioning of clofazimine	Dr Naibedya Chattopadhyay	01.04.2014	31.03.2017
Studies on the effects of obesogens in male germ cells an exploratory study	Dr D P Mishra	01.04.2014	31.03.2017
Preclinical development of Kaempferol with enhanced drug delivery for superior osteogenic activity	Dr Ritu Trivedi	01.04.2014	31.03.2017
Lead identification of non steroidal molecule with anti-proliferative activity for management of endometrial hyperplasia	Dr Anila Dwivedi	01.04.2014	31.03.2017
Preclinical development of orally active, rapid fracture healing agent	Dr Divya Singh	15.06.2014	14.06.2017
Studying mechanism of pro-fertility activity of mucuna pruriens, withania somnifera and asparagus racemosus in spermatogenically compromised rat model and identification of active phyto-constituents	Dr Rajender Singh	15.06.2014	14.06.2017
Xenobiotics and cytokines metabolizing enzymes gene polymorphisms in acquired aplastic anemia	Dr R K Tripathi	01.03.2015	28.02.2018

Project Title	Principal Investigator	Date of Start	Expected Date of compilation
Ministry of Earth Science			
Design and synthesis of Novel Dolastatins, Azumamides and Microsporin A analogs: a Quest for Anticancer Drugs	Dr Dipankar Koley	01.11.2012	31.03.2015
Biological evaluation, discovery of novel bioactive compounds & coorination of the MOES project Drug from Sea	Dr PK Shukla	01.11.2012	31.03.2017
Development of antimicrobial, anti-inflammatory and anticancer agents from the marine-organism and micro-organisms	Dr T Narender	01.08.2013	31.07.2016
Search for novel antimicrobial and anticancer metabolites from marine bacteria	Dr Prem Prakash Yadav	01.11.2014	31.10.2017
Synthesis and bioevaluation of chemical libraries of B-carboline based mimics of marine natural products	Dr Sanjay Batra	20.04.2015	19.04.2018
Synthesis of Fascaplysin analogues as possible anticancer agents	Dr Maddi Sridhar Reddy	20.04.2015	19.04.2018
Collection and fractionation of the identified leads such as NIO-905-A002(F003,4) and NIO-968 (CNS) NIO-970	Dr Madhu Dikshit	20.08.2015	19.08.2017
Third party verification and out sourcing of some of the activities related to Development of drugs from ocean	Dr Madhu Dikshit	08.12.2015	07.12.2017
Ligand and structure based screening of designed and synthesized chemical library around psammaplin A against DNA methyltransferase 1 (DNMT1) and diversity oriented synthesis of Pachastrissamine as anticancer agents	Dr Gautam Panda	01.02.2016	31.01.2019

Project Title	Principal Investigator	Date of Start	Expected Date of compilation
Indian National Science Academy			
Holistic epigenome analysis to identify methylated regions (DMRs) that affact male fertility	Dr Rajender Singh	01.04.2014	31.03.2017
Attenuation of GCSFr signaling by ubiquitination: Implications of E3 ubiquitin Ligases in GCSFr signaling mediated myeloid leukemia Pathogenesis	Dr Arun Kumar Trivedi	01.07.2014	30.06.2017
Understanding the role of heat shock proteins (HSPs) in Plasmodium falciparum survival in stress conditions	Dr Niti Kumar	01.01.2015	31.12.2017
Deciphering the role of SOCS proteins in regulating pro/anti-inflammatory response during experimental visceral leishmaniasis	Dr Susanta Kar	01.03.2016	28.02.2019
(i)Vaccine development against visceral leishmaniasis (ii) studies to investigate the modulation of Th17 pathways in VL in relation to potential vaccine (iii) Development of a new test model for rapid screening of antileishmanials	Dr Anuradha Dube	01.04.2016	31.03.2021

Project Title	Principal Investigator	Date of Start	Expected Date of compilation
Defence Research and Development Organization			
Pharmacokinetic studies of radioprotective formulation prepared from active principles isolated from *Podophyllum hexandrum*	Dr R S Bhatta	01.04.2016	31.03.2017
Development of preclinical and clinical radioprotective formulation prepared by combining podophyllotoxin and rutin	Dr R S Bhatta	13.10.2016	12.10.2017
CSIR Young Scientist Award			
Identification of Kinase and phosphatase specific to CTD serine7 of RNA Polymerase II	Dr Sohail Akhtar	01.05.2011	30.04.2016
Elucidation of functional inactivation of cdx2 expression in colon cancer cells: possible role of E3 ubiquitin ligases in regulating steady state levels of cdx2 protein expression via ubiquitination	Dr A K Trivedi	01.04.2014	31.03.2019

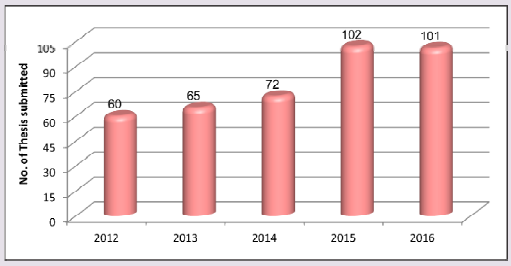
JC Bose Fellowship			
Molecular studies to delineate the role of nitric oxide/nitric oxide synthase in neutrophil maturation, survival and functions.	Dr Madhu Dikshit	24.02.2016	30.11.2017
(i) Vaccine development against(VL),(ii) Studies to investigate the role of Th17 cells in the pathology of VL in comparison to Th1/Th2 paradigm in experimental animal models (iii) Development of experimental models (iv) understanding of drug resistance mechanism(v) Antileishmanial drug discovery and augmentation in drug efficacy by immunomodulation and delivery approach	Dr Anuradha Dube	09.08.2016	08.05.2019
CSIR Emeritus Scientist			
Integrated 3D molecular modeling, design and synthesis of novel chemical entities (NCEs) as potential agents for the treatment of Alzheimer disease	Dr A K Saxena	01.05.2014	30.04.2017
Standardized Phytopharmaceuticals for the prevention and treatment of the bone related disorders and cardiovascular health: End-to-end preclinical development	Dr Rakesh Maurya	06.01.2017	05.01.2020
Department of Atomic Energy			
Design and synthesis of donor-acceptor based new organic fluorescent dyes and their applications	Dr Atul Goel	06.01.2016	05.01.2021
NMITLI			
Novel DPP IV inhibitor-Phase I/II Study : A Safety, pharmacokinetic and pharmacodynamic study of CPL-2009-0031 in healthy volunteers and patients with type 2 diabetes mellitus (T2DM)	Dr SK Rath	01.04.2016	31.03.2019
AYUSH			
Exploration, identification and isolation of bone fracture healing agents from Indian folk traditional plants Pholidota articulate and *Coelogyn cristata* (Orchidaceae)	Dr KR Arya	31.12.2014	31.12.2017

4. Sponsored Project

Project Title	Funding Agency	Principal Investigator	Date of Start	Expected Date of compilation
Licensing agreement of plant extract A-4744.	PHARMANZA Herbal Pvt. Ltd., Gujarat	Dr N Chattopadhyay	01.04.2016	31.03.2017
Synthetic microbicidal vaginal spermicides: Design, synthesis and biological evaluation.	HLL, Thiruvanantpuram	Dr Gopal Gupta	22.06.2015	21.06.2018
Toxicology study of RISUG implanted in the uterus of Rats	IIT, Kharagpur	Dr RK Singh	25.05.2016	24.05.2018
In vitro screening of ARP compounds	Advance Research Products, Paterson, NJ, USA	Dr Kumkum Srivastava, Dr Satish Mishra	24.05.2016	23.05.2018
NMR spectroscopic characterization of INTAS DP	INTAS Pharmaceuticals Limited, Ahmedabad	Dr Ashish Arora	29.07.2016	28.07.2017

5. Consultancy Project

Project Title	Funding Agency	Principal Investigator	Date of Start	Expected Date of compilation
TEM/DLS analysis of liposomes/vesicles	Galaxy Surfactants, Navi Mumbai	Dr Manish Chourasia	15.03.2016	14.03.2017
Bone biology including osteoporosis covering the pathology, animal model, clinical and preclinical end points and treatments	GSKCH, Gurgaon	Dr N Chattopadhyay	04.04.2016	03.04.2017



Human Resource Development

1. Ph. D. thesis submitted

S. No.	Name of Student	Title	Name of Supervisor
1.	Chandan Kumar Maurya	Role of innate immune components in inflammation induced insulin resistance	Dr Akhilesh K Tamrakar
2.	Reshu Saxena	Modulation of Candidate Eukaryotic Cell Protein Expression Mediated by HIV-1 Nef	Dr R K Tripathi
3.	Amit Kumar Sonkar	Identification and Biochemical Characterization of Rna14 and its interacting partners in fission yeast *Schizosaccharomyces pombe*	Dr Shakil Ahmed
4.	N Thrirupathi	Synthesis of medicinally Interesting heterocycles via electrophilic cyclization of alkynols and alkynamines	Dr M S Reddy
5.	Puneet Kumar Gupta	Synthesis of bioactive heterocycles as Estrogen Receptor modulators	Dr Kanchan Hajela
6.	Shrikant Sharma	Conformational studies of cyclic peptides with $\alpha_3\beta, \alpha_3\gamma$ architecture and structural analysis of SIX3-protein and its mutants involved in Holoprosencephaly	Dr Ravi Sankar Ampapathi
7.	Ruby Goel	A comparative study on the Central Renin Angiotensin System in LPS induced Neuroinflammation and Memory Impairment in normotensive and hypertensive rats	Dr Rakesh Shukla
8.	Manisha Yadav	Repurposing of FDA-approved drugs towards anti-cancer activities and detailed mechanistic elucidation of an anti-cancer compound with aryl naphthyl scaffold	Dr Sabyasachi Sanyal
9.	Kiran Kumar Yalla	Synthesis of various heterocycles via electrophilic cyclization of alkynols and alkynamines and synthesis of medicinally important cyclic/acyclic scaffold	Dr M S Reddy
10.	Devireddy Anand	Synthesis of novel N-heterocyclic compounds as bioactive agents	Dr P P Yadav
11.	Pancham Singh Kandiyal	Design, Conformational studies of peptidomimetics containing linear and cyclic sugar amino acid (SAA), β - Homoproline and Studies involving β-peptides as inhibitorsfor protein-protein interaction	Dr Ravi Sankar Ampapathi
12.	Vishal Srivastava	Proteome analysis of mycobacterial sigma factor, s*igF* mutants	Dr B N Singh
13.	Vikas Sharma	Epigenetic regulation of steroid receptors in prostate cancer cells by dietary and synthetic compounds	Dr Gopal Gupta
14.	K Durga Rao Vishwanadham	Design synthesis and biological evaluation of lipidated small molecules as a targeted anti cancer agents	Dr Manish Chourasia
15.	Ramakrishna K Kumar G	Synthesis of glycohybrids and their biological activities	Dr R P Tripathi
16.	Sonal Shree	Structural and Functional Studies on ACT/ RAM domain containing Protein(s) from Mycobacteria	Dr R Ravi Shankar
17.	Rizwnanul Haque	Identification and molecular characterization of genetic modulators associated with neurodegenerative disease: Studies employing transgenic *C. elegans* model	Dr Aamir Nazir
18.	Ashok Ranjan Nayak	Structure Function studies on selected proteins of unique metabolic importance from human pathogens	Dr J V Pratap
19.	Karan Singh Saini	Investigations into the Cross-Talk between androgen and cytokine signaling pathways in breast cancer	Dr Rituraj Konwar
20.	E Ramakrishna	Phytochemical investigation of Indian medicinal plant in search of anti diabetic and anti osteoporotic compound and chemical transformation of bioactive molecules	Dr Rakesh Maurya
21.	Samriddhi Shukla	Identification of epigenetic modulatory phytochemicals and their modes of action in non-small cell lung cancer	Dr Syed. Musthapa M
22.	Sajid Khan	Investigating the role of epithelial-to-mesenchymal transition in breast cancer metastasis: Possible therapeutic interventions	Dr Syed Musthapa M
23.	Dhanaraju Mandalapu	Design, Synthesis and Biological Profiling of Novel Synthetic Agents for the Management of Contraception and Cancer	Dr V L Sharma
24.	Richa Saxena	Studies on the identification and contribution of macrophage proteins during intracellular expression of mycobacterial cytosolic kinase: Manifestation of the role in mycobacterial persistence in macrophage	Dr Kishore K Srivastava
25.	Shahida Omar	Diversity Oriented Synthesis of Fluorescent Aromatic /Heterocyclic Scaffolds for Biological and Chemosensing Applications	Dr Atul Goel
26.	MuktanandTripathi	Exploration of the functional significance of fructose biosynthesis (polyol) pathway in male reproductive system	Dr Rajender Singh
27.	Sumit Joshi	Identification and synthesis of antigenic epitopes of *L. donovani* Th1 stimulatory proteins for the development of synthetic vaccine against visceral Leishmaniasis	Dr Anuradha Dube
28.	Nishant Singh	Design, Synthesis and Biological Evaluation of Sugar Amino Acid Based Glycopeptide Mimics and Total Synthesis of Bioactive Natural Products	Dr Dipankar Koley
29.	Lokesh Kumar	Pre and post-ejaculatory events governing sperm fertility: Novel targets for contraceptive intervention	Dr Gopal Gupta
30.	Neha Singh	Identification of the role of Serine 7 phosphorylation in mRNA transcription	Dr Sohail Akhtar

31.	Shivani Dixit	Evaluation of therapeutic efficacy of vitamin D or its analogs alone or in combination with phytochemicals in cancer	Dr Rituraj Konwar
32.	V Niranjan Kumar	Characterization of paraflagellar rod assembly in *Leishmania*	Dr Amogh A Sahasrabuddhe
33.	Mohd. Hameem	The role of human DNA Ligase 1 in DNA replication	Dr Dibyendu Banerjee
34.	Himanshu Pandey	Biophysical and immunological characterization of selected proteins of ESAT-6 family from *Mycobacterium tuberculosis* H37Rv	Dr Ashish Arora
35.	Kyatham Srinivas	Total Syntheses and Biological Evaluation of Bioactive Izidine Alkaloids, Cyclic Peptides and Their Derivatives	Dr DipankarKoley
36.	Sama Ajay	Studies on Stereoselective synthesis of cytotoxic molecules	Dr Arun K Shaw
37.	Amit Kumar Singh	Functional analysis of epigenetic modifications and interactions of the carboxy-terminal domain of RNA polymerase II	Dr Sohail Akhtar
38.	Shivangi Rastogi	Identification and characterization of enzyme(s) involved in fatty acid utilization by *Mycobacterium tuberculosis* during dormancy	Dr YK Manju
39.	Ashish Kabra	Structural characterization of protein(s) involved in translation from *Wolbachia* endosymbiont strain TRS of *Brugiamalayi* and *Vibrio cholera* peptidyl-tRNA hydrolase	Dr Ashish Arora
40.	Tarun Kumar Barbhuyan	Evaluation of bone quality and biomaterial composition under physiological and pathophysiological conditions, and pharmacological interventions	Dr Naibedya Chattopadhyay
41.	Vikash Kumar	Computational studies on protein targets involved in cancer and *in-silico* identification of potential anticancer agents	Dr Mohd. Imran Siddiqi
42.	Kumar Sachin Singh	Characterization of selected genes of glycine metabolic pathway and their role in mycobacterial survival	Dr Sudheer K Singh
43.	AshutoshPati Tripathi	Role of host miRNA in survival of mycobacterium in macrophages	Dr B N Singh
44.	Anshika Tandon	Studies on the characterization of structural, functional and biological properties of small peptides derived from proteins of LPS recognition machinery or analogs of naturally occurring antimicrobial peptides	Dr Jimut Kanti Ghosh
45.	M Zakir Hossain	Development and elucidation of mechanism of action of pancreastatin inhibitor(s) to control Diabetes	Dr JR Gayen
46.	Kripa Shankar	Chronic hyperinsulinemia and high fat diet in the development of Insulin resistance: Comparative metabolic profiling and novel therapeutic interventions	Dr Anil N Gaikawd
47.	Sudhir Kumar	Isolation and characterization of natural products for bio-evaluation and Chemical transformation of bioactive compounds	Dr Rakesh Maurya
48.	Dighe Shashikant Uttam	Cascade Strategies for the Synthesis of fused-Nitrogen Heterocycles and β-carboline-based Natural Products	Dr Sanjay Batra
49.	Manjeet Kumar	Identification of novel Nef interacting protein in *C.elegans* and their functional role in human	Dr Raj Kamal Tripathi
50.	L Ravithej Singh	Exploring the functional diversity of 4-hydroxy alkylisophthaldehyde for the synthesis of medicinally important small molecule libraries.	Dr KV Sashidhara
51.	Pankaj Sharma	Proteome analysis of murine lung exhibiting filarial manifestations of tropical pulmonary eosinophilia	Dr Mrigank Srivastava
52.	Amit Kumar Tripathi	Characterization of antimicrobial, cytotoxic and anti-endotoxin properties of designer peptides and peptides of natural origin	Dr Jimut Kanti Ghosh
53.	Manoj Kathuria	Studies on the mode of action of promising anti-leishmanial agents	Dr Kalyan Mitra
54.	Raghavendra Murugula	Design and synthesis of novel peptidomimetics of biological interest	Dr W Haq
55.	Kapil Upadhyaya	Synthesis of glycohybrid molecules as new chemotherapeutic agents	Dr R P Tripathi
56.	Gaurav Kumar Singh	Effect of C-terminus truncation of Mad2 on mitotic spindle checkpoint in fission yeast *Schizosaccharomyces pombe*	Dr Shakil Ahmed
57.	Ravi Thakur	Studies on the molecular instincts and micro environmental instigations in cancer	Dr DP Mishra
58.	Rohit Mahar	NMR based metabolic profiling of targeted secondary metabolites in selected anticancer plants	Dr Sanjeev K Shukla
59.	N Devender	Synthetic studies on butenolides and β-amino alcohol derivatives as chemotherapeutic agents	Dr R P Tripathi
60.	Chadchan Sangappa Basanna	Determination the role of endoglinsignalling in uterine receptivity for the embryo implantation	Dr Rajesh Kumar Jha
61.	Manisha Dixit	Investigation of the effects of Medicarpin and related pterocarpan(s) on fracture healing in rats	Dr Divya Singh
62.	Arindam Bhattachrya	Mechanistic aspects of cell death induced by antineoplastic agents in human cancer cell lines	Dr KalyanMitra
63.	Anup Kumar Singh	Molecular characterization and targeting of cancer stem cells (CSCs): deciphering the cellular mechanism of action of CSC specific chemotherapeutic agents	Dr Dipak Datta
64.	Saman Khan	Understanding the role of heterochromatin defective mutants on replication fork stability and checkpoint control in fission yeast *Schizosaccharomyces pombe*	Dr Shakil Ahmed

65.	Joyshree Biswas	To investigate the role of astrocytes, mitochondrial function, glucose transport and neuronal death mechanism in Alzheimer's pathology: A study in streptozotocin induced experimental model	Dr Sarika
66.	Nidhi	Computational studies on protein targets involved in infectious diseases and *in-silico* identification of potential anti-infective agents	Dr M I Siddqi
67.	Rakesh Arya	Differential role of HSP60 in cancer	Dr Dipak Datta
68.	Pragati Agihotri	Structural and functional studies of *L. donovani* trypanothione biosynthesis pathway and *V. Cholreae* RNA-polymerase sigma factor	Dr J V Pratap
69.	Om Prakash Singh Patel	Synthesis of Functionalized Indoles, Pyridines and Related N-Heterocycles as Antihyperglycemic Agents	Dr P PYadav
	CSIR-CDRI, AcSIR		
70.	Nikunj Sethi	A Novel Metabolomics Based Approach for Studying Teratogenic potential of Drugs and Chemicals Employing Nuclear Magnetic Resonance Spectroscopy	Dr Neeraj Sinha
71.	Vivek Kumar Pawar	Nanocarriers for Effective Delivery of Chemotherapeutic Agents against Breast Cancer	Dr Manish K Chourasia
72.	Saroj Verma	A Search for potential new antimalarial molecules from *In Silico* rationales for *In Situ* exploration	Dr Y S Prabhakar
73.	Renu Pandey	Development and Validation of Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS) Methods for the Quantitative and Quantitative Analyses of Bioactive Metabolites from Selected Indian Medicinal Plants	Dr Brijesh Kumar
74.	Sweta Misra	Cloning Characterization and Validation of *Brugia Malayi* UDP-Galactopyranose Mutase as an Antifilarial Drug Target	Dr Shailja Bhttachraya
75.	Sarika Gunjan	Exploration of mechanisms involved parasite cell death and their exploitation to control malaria	Dr Renu Tripathi
76.	Isha Taneja	Preclinical Pharmacokinetic Characterization of Medicarpin and Prediction of its Human Pharmacokinetics Using Species Invariant Time Approach Based on Allometry Concept	Dr Wahajuddin
77.	Priyanka Kushwaha	To study the role of miRNA's in the regulation of bone mass	Dr Ritu Trivedi
78.	Awantika Singh	Application of Hyphenated Mass spectrometric Techniques in Qualitative and Quantitative Analysis of phytochemicals from selected Indian Medicinal Plants	Dr Brijesh Kumar
79.	Hemalata Dwivedi	Study of Host-Pathogen interaction and Chemotherapeutic intervention during cerebral malaria	Dr Renu Tripathi
80.	Ankur Omer	Exploring Multi-scale Role of Some Selected Molecules Against Cancer	Dr Poonam Singh
81.	Jyoti Gupta	Evaluation of Immunoprophylactic Efficacy of DNA Vaccine Employing *Brugia malayi* Heavy Chain Myosin (Bm- Myo) and Trehalose -6 Phosphate phosphatase (Bm-TTP)	Dr Shailja Bhttachraya
82.	Kanumuri Siva Rama Raju	Investigation of preclinical Pharmacokinetics of Isoformononetin, a potential anti-osteoporotic compound and isoflavones-drug interactions	Dr Wahjuddin
83.	Dhanvantri	Molecular Characterization of Transcription Elongation Factor (WolGreA) of Bacteria Endosymbiont *Wolbachia* of Filarial Parasite *Brugia malayi*	Dr Shailja Bhttachraya
84.	Sunita Saxena	Identification and Characterization of Setariacervi microfilariae antigen(s) recognized by surface specific antibody	Dr Neeloo Singh
85.	Swati Jaiswal	Preclinical Pharmacokinetic Profiling of Novel Anti-Cancer Compounds and Population PK-PD Modeling of Miltefosine	Dr Jawahar Lal
86.	Saima	Green Approaches Towards Formation of S-S and C-X (X=S, N) Bonds and their Application in Synthesis of Bioactive Molecules	Dr Arun K Sinha
87.	Kapil Dev	Phytochemical Investigation of Medicinal Plants and Development of New Methodologies for the Synthesis of Bioactive Indole Analogues	Dr Rakesh Maurya
88.	Rajasekar Nagarajan	Study on the Role of Astrocytic Insulin Receptor signaling in Neuroinflammation and Memory Impairment	Dr Rakesh Shukla
89.	Pankaj Kumar Singh	Ligand anchored polymeric nanoparticle system for effective treatment of visceral leishmaniasis	Dr Manish K Chourasia
90.	Viakas Bajpai	Development and Validation of DART MS and LC-ESI-MS/MS Methods for Qualitative and Quantitative Analysis of Phytochemicals from Selected Indian Medicinal Plants	Dr Brijesh Kumar
91.	Preeti Chandra	Chemical Profiling and Quantitative Studies on Bioactive Phytocompounds in Selected Medicinal Plants using Hyphenated Liquid Chromatography Tandem Mass Spectrometric Techniques	Dr Brijesh Kumar
92.	AbhilashaSaxena	An In-vitro Evaluation of Antileukemic Activity of Two Plant Extracts against Acute Myeloid Leukumia	Dr R K Singh
93.	Yogesh Abaso Thopte	Development of Green Synthetic Methodologies for Biologically Important Small Molecules Employing Carbon-Carbon and Carbon-Heteroatom Bond Breakage/Construction Strategy	Dr Arun K Sinha
94.	Neetu Singh	A study on the role of fatty acid synthase in pulmonary hypertension and its associated dysfunctions	Dr Kashif Hanif
95.	Seema Singh	Understanding the NMDAR antagonist induced behavioural and neurochemical changes in mice mimicking psychosis	Dr Shubha Shukla

96.	Nitin Hauserao Andhre	Green Synthesis Bioactive Phenolics bearing Heterocylic Moieties and Evaluation of their Biological Activity	Dr Arun K Sinha
97.	Shome Sankar Bhunia	Design, Synthesis and Molecular Modeling Studies on Substituted indoles as Potential Antithrombotic Agents	Dr A K Saxena
98.	Sarat Chandra	Molecular Modeling and Cheminformatics studies on selected protein drug targets involved in Type 2 Diabetes	Dr M I Siddqi
99.	Shweta Kaushik	Molecular Basis of Isoflavones Genistein and Daidzein regulation of Centchroman action in Human Breast Cancer	Dr Anil K Balapure
100.	Monika Mittal	Characterization of aldehyde dehydrogenase as a bone anabolic targets and its pharmacological manipulation	Dr Naibedya Chattopadhya
		IFTM University, Moradabad	
101.	Shubhra Singh	A Study on Modulation of Mycobactricidal activity of Mouse macrophages by Nitric oxide Donors	Dr Vineeta Chaturvedi

2.1 Training to Post Graduate Students

During the calendar year, a total of **121** Post-graduate students from **48** Colleges/Universities and their affiliated colleges from all over the country were selected on merit basis and were imparted training in various disciplines of drugs and pharmaceutical research for 4-10 months duration.

2.2 Training to Post Graduate Students

CSIR-CDRI being a mentor institute for the NIPER Raebareli, imparted one year project training in biomedical research to **30** M.S. (Pharm) Pharmaceutics & Medicinal Chemistry specialization students.

2.3 Training under cooperation with INSA & NASI

Under the programme, **08** INSA & NASI fellows from different institutes were provided training in different aspects of biomedical research.

3. Training program attended by CSIR-CDRI staff

In the reporting year following Scientist/Technical staff from CSIR-CDRI attended various training programs and workshops for updating their knowledge and expertise in different disciplines.

Name of the Staff	Title of the Programme	Place	Date
Dr Shailja Bhattacharya	Three days training programme for CPCSEA Nominee (Scientist)	National Institute of Animal Welfare, Faridabad	24-26 May, 2016
Dr A K Dwivedi	Training Program on Good Governance and Transparency	CSIR-HRDC, Ghaziabad	18-20 February, 2016
	GLP Training	CSIR-CDRI, Lucknow	08-09 September, 2016
Dr Bhupendra N Singh	Management Training	HRDC, Ghaziabad	4-6 May, 2016
Dr Manish K Chourasia	Training Course on Science Governance and Management	ASCI, Hyderabad	29 February- 04 March, 2016
Dr Vivek Bhosale	*In silico* strategies for disease pathway analysis and biomarker discovery	Biotech Park, Lucknow	29-31 March 2016
Dr Rabi Sankar Bhatta	Workshop on data analysis using NONMEM	ACTREC, Mumbai	01-03 August, 2016
	GLP Training	India Habitat Center, New Delhi	19-23 December, 2016
Rajesh Kumar Jha	Mandatory Training Programme (Scientist), CPCSEA,	National Institute of Animal Welfare, Faridabad	24-26 May, 2016
	ICAR sponsored short course entitled 'Optimizing Fertility in Live Stock of Hill Ecosystem Applying Modern	National Research Centre on Yak, Dirang, West Kameng District, Arunachal Pradesh	22-31 August, 2016
Dr Jiaur R Gayen	GLP Training	India Habitat Center, New Delhi	17-18 October, 2016
	CPCSEA Training	National Institute of Animal Welfare, Faridabad	24-28 October, 2016
Dr Sharad Sharma	Training on Good Laboratory Practice	CSIR- CDRI, Lucknow	8- 9 August 2016
Dr SK Rath	Training on Good Laboratory Practice	CSIR- CDRI, Lucknow	8 - 9 August 2016
	4th GLP Inspectors Training	NGCMA New Delhi	19-24 December, 2016
	Training on Good Laboratory Practice	CSIR- CDRI, Lucknow	13 January, 2017
Dr R K Tripathi	Training on Good Laboratory Practice	CSIR- CDRI, Lucknow	8 - 9 August, 2016
Dr Aamir Nazir	Training on Good Laboratory Practice	CSIR- CDRI, Lucknow	8 - 9 August, 2016
Dr Smriti Bhadauria	Training on Good Laboratory Practice	CSIR- CDRI, Lucknow	8 - 9 August 2016
Dr Sarika Singh	Training on Good Laboratory Practice	CSIR- CDRI, Lucknow	8 - 9 August 2016
Dr Namrata Rastogi	"Visible Light Photoredox Catalysis Towards Sustainable Future" under Global Initiative on Academic Networks (GIAN) Programme	IISER, Bhopal	22 August 02, September, 2016

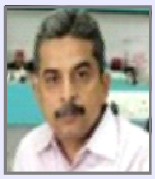
Honours and Awards

Dr Renu Tripathi

- Elected Fellow of National Academy of Sciences of India (NASI)

Dr Sanjay Batra

- Elected Fellow of National Academy of Sciences of India (NASI)



Dr Sabyasachi Sanyal

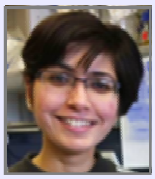
- Elected Fellow of National Academy of Sciences of India (NASI)

Dr Rajender Singh

- 'Innovative Young Biotechnologist Award' (IYBA)-2015 by Department of Biotechnology

Dr Niti Kumar

- 'Innovative Young Biotechnologist Award' (IYBA)-2015, by Department of Biotechnology
- Best Poster presentation CTDDR-2016



Dr A K Dwivedi

- Dr Animesh Chakraborty Memorial Oration at 26th Annual Conference of Indian Pharmacological Society, Kolkata

Dr RP Tripathi

- Life Time Achievement Award-2016 by Association of Carbohydrate Chemists & Technologists (India)

Dr Rabi Sankar Bhatta

- Distinguished Speaker Award 2016 by The Boston Society, USA

Dr Aamir Nazir

- Raman Research Fellowship by CSIR

Dr Smrati Bhadauria

- Selected for INSA-DFG Bilateral Exchange Program by INSA-DFG

Dr Rajesh Jha

- Prof. G.P.Talwar,Young Scientists Award-2016 by Indian Society for the Study in Reproduction and Fertility (ISSRF 2016)

Dr Kashif Hanif

- Received Membership of Pulmonary Vascular Research Institute (United Kingdom) sponsored by United Therapeutics (USA)

Dr Wahazuddin

- Young Scientist Award 2016 by International Union of Biochemistry and Molecular Biology at Vancouver, Canada.
- Young Scientist Award by State Government of Uttar Pradesh, India.
- TWAS/BVL.NXT 2016 Fellow by Academy of Sciences in Developing World (TWAS) and the Fondation Pour l'Université de Lyon

Dr Atul Goel

- CRSI Bronze Medal Award 2016 by The Chemical Research Society of India, Bangalore
- Best Oral Presentation Award at International conference on Materials Engineering and Nanotechnology, Taipei, Taiwan

Dr Mukesh Pasupuleti

- Senior Scientist Award-2016 by Association of Biotechnology and Pharmacy, India
- Outstanding Scientist-2016 Award by Venus International Foundation Chennai
- Dr. APJ Kalam Award for Scientific Excellence-2016 by MARINA Labs Chennai

Dr KR Arya

- Dr BN Mehrotra Medal for 2015-2016 bySociety of Ethnobotanists, India

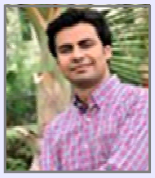
Dr Samala Srinivas (Student of Dr Bijoy Kundu)

- Dr MM Dhar Memorial Distinguished Career Achievement Award-2016 for Chemical Sciences

Mohd. Parwez Khan
(Student of Dr N Chattopadhyay)

- Dr MM Dhar Memorial Distinguished Career Achievement Award-2016 for Biological Sciences

Dr Hardik Chandasna
(Student of Dr Rabishankar Bhatta)



- Dr JM Khanna Memorial Distinguished Career Achievement Award-2016 for Pre-clinical & Clinical Sciences

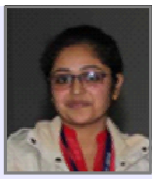
Mr. Sajid Khan
(Student of Dr Syed Musthapa Meeran)

- Dr JM Khanna Memorial Early Career Achievement Award 2016

Ms. Shweta Sharma
(Student of Dr P R Mishra)

- Dr Swarn Nitya Anand Memorial Early Career Achievement Award 2016 for Women Research Scholars

Ms Pallavi Awasthi
(Student of Dr Atul Goel)

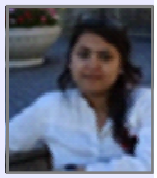


- Best Poster Award 2016 at European Journal of Organic Chemistry, Wiley, Germany

Mr Guru R Valicherla
(Student of Dr Jiaur R Gayen)

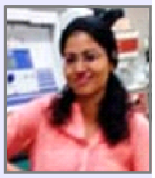
- AAPS Graduate Student Research Award by American Association of Pharmaceutical Scientists (AAPS), USA

Ms Hafsa Ahmad
(Student of Dr AK Dwivedi)



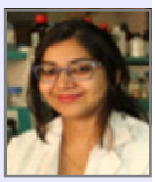
- Best paper presentation award 'National seminar on glimpses of research work in taxonomy and ethnobotany' organized by Society of Ethnobotanists and Association of Plant Taxonomy at CSIR-NBRI, Lucknow

Ms.Jyoti Bala Kaushal
(Student of Dr Anila Dwivedi)



- Best Poster Award By International Conference on Reproductive Health with Emphasis on Occupational, Environmental and Lifestyle Factors, 26th Annual Meeting of the Indian Society for the study of Reproductive & Fertility (ISSRF)

Ms Sonal Srivastava
(Student of Dr SK Rath)



- Best poster award by National conference on Recent Advances in Biomedical Science: Diagnosis and Research BIOMEDCON 2016

75 Years of
CSIR Touching Lives

Other Activities

CSIR-Central Drug Research Institute, Lucknow

CSIR-Central Drug Research Institute, Lucknow

Major Events Organized

65th Annual Day Celebrations

CSIR-CDRI celebrated its 65th Annual Day on the 17th February, 2016. On this occasion, in the morning session, the prestigious 41st Sir Edward Mellanby Memorial Oration was delivered by Dr Soumya Swaminathan, Director General, ICMR and Secretary, DHR, Ministry of Health & Family Welfare, Govt of India. The topic of her talk was "*Recent Advances in treatment of Tuberculosis*". The second part of the celebration started

with the graceful presence of Dr Rakesh Kapoor, Director SGPGI, Lucknow as the Chief Guest and Dr Soumya Swaminathan, as president of the function. Dr Madhu Dikshit, Director CSIR-CDRI welcomed the Chief Guest, other dignitaries and presented a detailed account of the achievements made by CSIR-CDRI during the reporting period (2015-16). Dr Rakesh Kapoor, Director, SGPGI, Lucknow said that SGPGI is ready to collaborate with CDRI for development of new drugs.

After that a new *Herbal Medicament for Bone Health-Reunion* was launched for marketing. This herbal medication is very useful for bone & fracture healing, pain and swelling of bone and joints caused by sprain and injury along with optimum bone health after menopause. This herbal preparation is made from leaves of *Dalbergia sissoo.* Institute's Annual Report-2015-16 was released by dignitaries on dais.

On this day, the prestigious CDRI Awards-2016 for Excellence in Drug Research was announced. These awards will be conferred on CSIR's Foundation Day in September this year. In Life Sciences category the award will be given to Prof. Patrick D'Silva, Associate Professor, Dept. of Biochemistry, IISc, Bengaluru and Chemical Sciences category the award will be given to Anthony Addlagatta, Principal Scientist, CSIR-IICT, Hyderabad.

Excellence awards to the top 5 publications, patents granted and technology licensed in 2015-16 were also conferred today. Besides this, Excellence awards viz. Dr MM Dhar Memorial Distinguished Career Achievement Award-2016 (for Chemical Sciences to Dr Samla Srinivas & for Biological Sciences to Mohd. Parwez Khan), Dr JM Khanna Memorial Distinguished Career Achievement Award-2016 (Pre-clinical & Clinical Sciences to Dr Hardik Chandasna), Dr JM Khanna Memorial Early Career Achievement Award 2016 to Mr Sajid Khan and Dr Swarn Nitya Anand Memorial Early Career Achievement Award 2016 for Women Research Scholars to Shweta Sharma were awarded. Furthermore, the institute felicitated the employees who completing 25 years of service. After felicitations to awardees, Dr Soumya Swaminathan, conveyed in her presidential remark that in coming days we have to face 10 major challenge in the health sector among them anemia and malnutrition is on the top then we have to take special care towards diabetes. The combination of traditional knowledge in form of modern medicine will help us to solve the problem more efficiently like the one example set by CDRI today with the launch of new Drug. The program was concluded with the vote of thank by Dr Rakesh Shukla, Chairman organizing committee.

6th International Symposium on "Current Trends in Drug Discovery & Research" (CTDDR-2016)

CSIR-CDRI celebrated 6th International Symposium on Current Trends in Drug Discovery & Research (CTDDR-2016) from 25th-28th February, 2016.This four days long vibrant event included keynote lectures, oral and poster presentations by a number of

international/national scientists and academicians featuring, both basic sciences and translational biomedical research. Almost 800 delegates from India and abroad have participated in this symposium which was concluded on Science Day on 28th February. On the inaugural day, CSIR-CDRI Director Dr Madhu Dikshit, welcomed the guests and participants of the symposium. In his Inaugural speech Chief Guest, Prof Ian Gilbert, Professor of Medicinal Chemistry and Head of the Division of Biological Chemistry and Drug Discovery, University of Dundee, UK, emphasized that as the disease burden and deaths due to them is increasing drastically in the tropical areas of the world we have to concentrate on Drug discovery for neglected diseases particularly malaria and tuberculosis. In his Presidential remark, Dr Tushar Kanti Chakraborty, Professor, Indian Institute of Science, Bengaluru and Former-Director, CSIR-CDRI gave his best wishes for success of this event and also emphasized on the need for drug development for the neglected diseases. During the four days of event participants witnessed outstanding scientific deliberations. At the concluding session of event during the valedictory function, best oral presentation award for young scientists were given to Ms Divya Thomas from University of Madras, Chennai and Ms Sonal from CDRI, Lucknow. Best poster presentation was also conferred to twelve participants for their outstanding research work. The organizing secretary Dr Arun K Sinha proposed the vote of thanks for successful organization of this four days long mega scientific event.

National Workshop on Small Molecule Analysis by NMR Spectroscopy & Mass Spectrometry

SAIF, CSIR-CDRI has organized a National Workshop on Small Molecule Analysis by NMR Spectroscopy & Mass Spectrometry during 16-18 March, 2016. The workshop has provided an opportunity to experience the state-of-the-art NMR, LC-MS and LCMS/MS techniques and initiate lively discussion among research scientists, academicians and young researchers to share their knowledge in the frontier areas of chemical sciences. The beginners have get a chance to familiarize themselves with NMR and LC-MS techniques and gain confidence by observing their applications and data interpretation as done in real situation. This Workshop was focused on the structure characterization of small molecules using NMR, LC-MS and MS/MS techniques. Total 38 participants (research scholars, faculty and industry participants) from different part of country have attended the workshop.

Two Day HPLC/UPLC Workshop

One two day HPLC/UPLC workshop was organized by CSIR-CDRI in collaboration with Waters India (P) Ltd. on method development on 10-11 March, 2016. Experts from CSIR-CDRI and Waters India explained about basics and principals of these instruments. Demonstration to do method development using HPLC/UPLC was also carried out on the instruments. Thirty five students/ technical staff participated and experienced the live demonstration and participated in discussion. All the participants interacted with the experts and were fully involved in practical sessions.

IInd Scientific and Technical Awareness Program (IInd-STAP-2016)

A Scientific and Technical Awareness Program (IInd-STAP-2016) in Animal Experimentation was organized at National Laboratory Animal Center, CSIR-Central Drug Research Institute, Lucknow on April 6-8, 2016 with a view to impart preliminary training to the institute research fellows on various aspects of humane care and scientific management of experimental animals vis-à-vis basic animal techniques. This training program has been an approved ongoing human resource development program of the institute being organized periodically in batch-wise manner on quarterly basis. A batch of 18 research fellows belonging to biological research divisions of the institute participated and successfully completed this program. Dr Anila Dwivedi, Sr. Principal Scientist of Endocrinology Division and Chairperson, Animal House Advisory Committee formally addressed the participants in the inaugural session and explained them the importance and relevance of such awareness programs. The training covered both,

theoretical and practical aspects of care and management of experimental animals including virtual demonstrations on common animal techniques.

National Technology Day-2016

CSIR-Central Drug Research Institute (CDRI) celebrated the National Technology Day at Lucknow on 11th May 2016.On the occasion in morning, Dr. Girish Sahni, Director General, CSIR addressed all 38 labs of CSIR through video conferencing. He urged every member of the CSIR family to join hands together and work for the society. He also emphasized to devolve the technologies for solving the problems of common man and Industry. In the afternoon session of celebration, Director, Dr Madhu Dikshit conveyed her greetings to all scientists and research scholars on this occasion for continuing the legacy of technological development. Mr Jayant Krishna, Chief Executive Officer, National Skill Development Corporation (NSDC) & Principal Consultant, Tata Consultancy Services (TCS) was the chief guest of this session. He delivered the special oration on "Information Technology in the Service of Mankind".

On this auspicious day for technology, Chief Guest Mr Jayant Krishna and other dignitaries on dais released CSIR-CDRI Newsletter Vol 7 No 2. The talk was attended by several hundred research scholars and scientists including the veteran scientist Padmashri Dr Nitya Nand, Dr BN Dhawan and Dr VP Kamboj. Program was concluded with the vote of thanks from Mr Vinay Tripathi.

National Workshop on Confocal Microscopy

Human resources devlopment, which is the process of developing the knowledge, skills, education, and abilities of an organization's employees, keeping the necessity and importance of it in mind, CSIR-CDRI and Carl Zeiss has jointly organized a National Workshop on Confocal Microscopy on 05-06 May, 2016. Carl Zeiss has also installed a high end confocal microscope at the EM Unit for demonstration proposes. Scientists and students learned the recent techniques and developments and analyzed their samples and evaluated the performance of the microscope.

One day workshop on Hindi (Ek Divsiye Hindi Karyashala)

To enhance the knowledge, skills, education, and abilities of an organization's employees to work in Hindi, during the reporting period, four One day workshop on Hindi (Ek Divsiye Hindi Karyashala) was conducted on 08 April, 28th June, 26 September, and 23 December, 2016 at CSIR-CDRI. Participants were explained the use and utility of Unicode. Workshop had two sessions one for members of administration and other for Scientist and Technical staff to discuss the Importance, necessity and utility of Hindi language.

Swachh Bharat Abhiyan Pakhawara

Swachh Bharat Abhiyan,is a national campaign by the Government of India. The mission has targeted aims for bringing behavioral changes to people and motivate health practices, spreading cleanliness awareness among them. To contribute in the mission, CSIR-CDRI, Lucknow organized "Swachh Bharat Abhiyan Pakhwara" from 30 May 2016 to 13 June 2016. Scientist, Technical & Administrative staff and research scholars of the institute participated enthusiastically in this program. Many other programs for cleanliness of Premises, offices and laboratories were also organized during this Pakhwara.

World No Tobacco day celebration

World No Tobacco Day is observed around the world every year on May 31. The day is intended to draw attention to the widespread prevalence of tobacco use

and to negative health effects, which currently lead to nearly 6 million deaths each year worldwide. On this occasion, CSIR-CDRI in collaboration with Public Dentistry Department, King George Medical University, Lucknow organized a Oral Health Screening Camp focusing on Oral Pre-cancer leision/conditions and Oral Cancer at CDRI. Many Scientists along with staff and research scholars participated in this camp.

Health checkup program

To meet the growing demands of the competitive world, most of us tend to ignore our health until we are compelled to confront a medical complication. To cope up with a rising risk of the medical disorders, monitor the self health have become mandatory. After all, most health problems can be managed more effectively if detected early. To enhance the awareness for preventive health checkup, CSIR-CDRI organized Health checkup program for Blood Pressure and Random Sugar on 7th April 2016 for the staff members of the institute who are at the age of 40 or above.

International Yoga Day

CSIR-CDRI celebrated International Yoga Day on 21st June 2016. June 21 is the longest day of the year in the Northern Hemisphere and has special significance in many parts of the world and considered as most energetic day of the year so, United Nations General Assembly (UNGA) on December 11, 2014 declared this day as the International Yoga Day to honor the centuries old contribution of India to developing Yoga as a physical, mental, and spiritual practice or discipline. CSIR-CDRI celebrated International Yoga Day on 21st June 2016 for all staff club members. Many scientists and research scholars participated in it.

Half Day Seminar on “Phytopharmaceutical in Drug Discovery Research”

To commemorate the superannuation of Dr Rakesh Maurya, Head, Medicinal and Process Chemistry Division, a Half Day Seminar on “Phytopharmaceutical in Drug Discovery Research” was organized at CSIR-CDRI on 30th June 2016. Dr Rakesh Maurya was felicitated for his outstanding contribution to Phytopharmaceuticals in Drug Discovery Research Director Dr Madhu Dikshit conveyed her best wishes to Dr Maurya for happy and prosperous life after retirement.

Study tour of Academicians/Scientists

A thirteen member delegation of trainees of training program on fish reproductive biotechnology for the Academician/Scientists working in various Research Institutes/ State Agricultural Universities across the country at ICAR-NBFGR, Lucknow, has visited CSIR-CDRI on 22 July 2016. The major objective of the study tour was, to understand the functioning of the organization and role of CDRI in Health and Drug Development. The delegates interacted with scientists of various divisions and visited major facilities of Institute.

Workshop on Molecular Docking, Virtual Screening & Computational Biology

A Workshop on Molecular Docking, Virtual Screening & Computational Biology has been organized at CSIR-CDRI in association with Schrodinger LLC from 1-3rd August 2016. Workshop provided coverage to the theoretical background as well as a hands-on approach to Molecular Docking and Virtual screening and the use of different software and Chem-informatics methods for lead identification and optimization. Around 35 Academicians, Scientists and Research Scholars from various Universities, college and Institutes participated in the event.

Good Laboratory Practice Training Workshop

A two days Good Laboratory Practice (GLP) Training Workshop was organized on 8th August 2016 to provide the training for the GLP taskforce engaged in GLP test facility in various capacities at Institute. The workshop was inaugurated with the welcome address of Director, Dr Madhu Dikshit. In her address she said, CSIR-CDRI is committed to establish National GLP Compliance

Monitoring Authority (NGCMA) approved GLP test facility at its new campus. Towards this objective this workshop will provide a big help for accreditation of CSIR-CDRI's GLP test facility. After the completion of this training, Institute will submit the application for approval of proposed test facility to NGCMA shortly. Dr. (Mrs.) Ekta Kapoor, from National GLP Compliance Monitoring Authority (NGCMA), Department of Science and Technology, New Delhi, Dr. Geetha Rajashekhar, Consultant at Qualtox Consultancy, Bengaluru and Dr. S.G. Ramachandra from IISc Bengaluru discussed various aspects of Good Laboratory Practices important for compliance. Study Plans/Study Reports were worked out after the orations for all the participants for getting acquainted with GLP-compliance.

Communal Harmony Day (Sadbhawana Diwas) Celebration

"Sadbhawana Diwas" was celebrated in the institute on August 19, 2016 with a theme to promote national integration and communal harmony among people of all religions, languages and regions. The idea behind observance of Sadbhawana Diwas is to avoid violence and to promote goodwill among the people. All the employees of CSIR-CDRI participated in this occasion and took the "Pledge of Sadbhawana" that they will work for the emotional oneness and harmony of all the people of India regardless of caste, region, religion or language.

National Workshop on "Applications of High-field NMR Spectroscopy in Drug discovery" (ANDD-2016)

A three days National Workshop on "Applications of High-field NMR Spectroscopy in Drug discovery" (ANDD-2016) was organized at CSIR-CDRI, Lucknow from 24-26 August, 2016. The aim of the workshop was to inculcate high end skill set among the participants by providing hands on experience on the state-of-art NMR spectrometers. Director, Dr Madhu Dikshit, inaugurated the workshop and in her opening remark she emphasized on the importance of learning recent techniques and enhancing new skills for high quality research. She said, learning the applications of High-field NMR spectroscopy will surely be very useful for Drug Development. She further expressed the hope that the participants will go back with rich knowledge and experience. Dr Brijesh Kumar welcomed all the participants came from various Institutes and universities from all across the country for developing their skills. He told CSIR-CDRI have world class NMR facility, participants can get maximum benefit from this workshop. Dr Ashish Arora, Dr T Narendra and Dr Sanjeev K Shukla trained the participants on various aspects of techniques and their applications. The hands-on-training on NMR Spectroscopy was provided to participants.

Symposium on "Recent Trends in Drug Development"

A symposium on "Recent Trends in Drug Development" was organized at CSIR-CDRI on 26 August 2016 to felicitate the long and dedicated service of Dr Rakesh Shukla, Head & Chief Scientist, to the Institute. Dr Rakesh Shukla superannuated on 31st August 2016. After the brief overview of symposium Director, Dr Madhu

Dikshit welcomed the guests and addressed the audience about the changes in the scenario of drug development in recent years. Prof. BN Dhawan, Ex-Director, CSIR-CDRI presided over the symposium. Eminent speakers, Dr Varun Gupta, Manager – Market Access and Pricing, Novartis Mumbai, Dr C Nath, Ex-Chief Scientist, CSIR-CDRI, Lucknow, Prof. Rakesh Shukla, Professor of Neurology, KGMU, Lucknow, Prof. BN Dhawan, Ex-Director, CSIR-CDRI, Lucknow addressed the audience during the symposium. After the oration from eminent scientists Director, Dr Madhu Dikshit felicitated Dr. Rakesh Shukla, Chief Scientist & Head, Division of Pharmacology, CSIR-CDRI, Lucknow for his long and dedicated services to Institute and science and conveyed her best wishes for happy and prosperous life after retirement.

CSIR Platinum Jubile Foundation Day Celebrations & CDRI Award Felicitation Ceremony

CSIR-Central Drug Research Institute, Lucknow celebrated the CSIR Platinum Jubilee Foundation Day Celebrations on 28th September 2016. Director, CSIR-CDRI, Dr Madhu Dikshit welcomed the guests on this auspicious occasion and said we feel proud to be a part of CSIR which was established in 1942. It has contributed significantly to the growth of Indian science & industry and in nation building.

On this occasion, Outstanding Scientist and JC Bose Fellow, Prof. Amitabha Chattopadhyay, from CSIR-CCMB, Hyderabad graced the occasion as chief guest. Prof Amitabha delivered a talk on, “Cholesterol in Biology and medicine: History, Myths and Excitement.” He said, cholesterol has been associated with the entry of a number of pathogens into host cells. He highlighted the various aspect of cholesterol in disease processes with an emphasis on diseases in the Indian context.

Dr V P Kamboj, Ex- Director, CSIR-CDRI presided over the function. In his presidential remark he mentioned, CSIR-CDRI, is an epitome Institute of this mega organization through its outstanding contributions in terms of Products and Technologies for affordable healthcare. Thereafter, dignitaries on dais released the CSIR-CDRI Newsletter (Vol.8 No.1, April to September, 2016).

CSIR-CDRI Awards-2016 was bestowed to the winners after their award oration for their excellent contribution in Drug Research. Under Biological Sciences the award was conferred to Dr. Patrick D’ Silva from, IISc, Bengaluru. Dr Patrick delivered award oration entitled “Antioxidant Nanozyme Therapeutics against Oxidative Stress Disorders”. He discussed about his novel findings and said; Nanomaterials with inherent enzyme-like activity attracted significant current interest due to their ability to replace specific enzymes in enzyme-based applications and demonstrated that nanowires exhibit remarkable antioxidant activity at physiologically relevant conditions. The internalization of nanowires restores the reactive oxygen (ROS) balance and controls the oxidative stress in the cell.

For Chemical Sciences the award was conferred to Dr Anthony Addlagatta, from CSIR-IICT, Hyderabad. Dr. Anthony delivered award oration entitled “Drug discovery efforts against Mtb and Malarial enzymes.” In his oration he said, Mtb and malaria are in top of the list that claim lives across the globe. There were no new drugs in last few decades and old drugs find resistance from pathogens. This necessitates finding new targets and their inhibitors that may become new drugs. He has identified two classes of enzymes which are involved in protein degradation. Both these classes of enzymes are proved to be important for microbes. He has determined structures of these enzymes from several pathogenic bacteria and screened inhibitor libraries to identify inhibitors with selectivity and high affinity.

During the second session of celebrations in after noon, mementoes were given away to colleagues completing 25 years of service in CSIR and to colleagues superannuated during Sep 2015 Aug 2016. Prizes were awarded to the winners of drawing, essay writing and quiz competitions organized on the sidelines of the Platinum Jubilee Foundation Day Celebrations. The Platinum Jubilee Foundation Day Celebrations ended with the vote of thanks proposed by Mr. Vinay Tripathi

Indian International Science Festival -2016

As a precursor event of Indian International Science Festival -2016, the largest science festival of its kind, CSIR-

CDRI celebrated an “OPEN DAY” on 11th November 2016 at Jankipuram Campus. This is an Outreach & Pre-event activity of IISF-2016 to get acquainted with the deep intricacies of drug research and to provide the feel of the research activities of the Institute to the common man and students. During the “OPEN DAY” more than 1600 people including the students from 20 schools and 12 colleges from Lucknow visited the Institute and interacted with the scientists to understand the working with major and unique facilities. An Exhibition of Technologies, Processes and Products developed by the CSIR-CDRI was arranged in the auditorium complex. Most of visitors have shown interest in exhibition and appreciated the scientific contributions of CDRI. Science model Exhibition and Quiz competitions were organized for school children. More than 15 schools participated in these competitions.

XII J-NOST Conference for Research Scholars at CSIR-CDRI

XII J-NOST Conference for Research Scholars was organized at CSIR-CDRI from 24-27 November, 2016. Conference was inaugurated by the welcome address by Dr Madhu Dikshit, Director, CSIR-CDRI Lucknow. Prof Anura Wickramasinghe, University of Peradeniya, Sri Lanka and Prof Oliver Reiser, University of Regensburg, Germany delivered the Guest lectures. During this four day conference about 70 oral presentations were delivered by research scholars and about 73 posters were presented.

National Workshop on Analytical Phyto-pharmaceutical Chemistry by High Performance Liquid Chromatography-Mass Spectrometry

To contribute in Skill Development program SAIF, CSIR-CDRI organized a five day long National Workshop on Analytical Phytopharmaceutical Chemistry by High Performance Liquid Chromatography-Mass Spectrometry from 5-9 December, 2016. Scientists and researchers from various part of country learned the recent techniques and developments of Analytical Phytopharmaceutical Chemistry.

National Workshop on Applications of Transmission Electron Microscopy in Life Sciences

Human resources development, which is the process of developing the knowledge, skills, education, and abilities of an organization’s employees, keeping the necessity and importance of it in mind, a National Workshop on “Applications of Transmission Electron Microscopy in Life Sciences” organized by CSIR-CDRI, Lucknow during 23-25 January 2017. Scientists and students learned the recent techniques and developments and analyzed their samples and evaluated the performance of the microscope.

Special training and motivation program for rural marginal Girls

CSIR-CDRI lucknow, in association with Sarva Shiksha Abhiyan UP and CARE India (NGO) organized a five day special training and motivation program for 15 selected marginal rural girls from Kasturba Gandhi Balika Vidyalaya, Jarbal , Bahraich from 9-13 January 2017 at CDRI. This program was aimed to provide motivation

and to develop new thinking in the field of Healthcare and science to the marginal girls which would be very helpful to them as well as to their family and the society from which they belong.

15th B Mukerji Memorial lecture

CSIR-CDRI organized 15th B Mukerji Memorial lecture in the memory of its First Indian Director, Dr Bishnupada Mukerji on 3 February, 2017. Director, Dr Madhu Dikshit, in her welcome address said, Dr Mukerji is remembered for his dedication, vision, and work ethic that shaped the mission of the institute during its formative stages. Dr. Mukerji laid the foundation of drug discovery and shaped CDRI by his interest and experiences in pharmaceutical sciences, and supported by the political leadership immediately after independence,

Dr Altaf Lal, Senior Advisor, Global Health & Innovation, Sun Pharm and Alumnus of CDRI, in his oration said, the institute has productive history of collaborations with pharmaceutical industry that has been widely acknowledged. There is now consensus that development of new and improved medical products, which are guided by advances in genomics, proteomics, stem cell research, systems biology, etc., would require very close and focused collaboration with industry, academia, and government, including regulatory agencies.

In his presidential remark, Padma Shri Dr Nitya Anand, former Director CSIR-CDRI, admired Dr Mukerji's organisational skills, foresight, vision to shape the destiny of CSIR-CDRI, in its formative stages and to achieve the status of premiere centre for research on drugs and diseases internationally.

Program was concluded with the honour of guests by presenting the mementos and vote of thanks by Dr A K Dwivedi, Chief Scientist.

Societal Activities

Students Motivation Programs for various Schools & Colleges

To initiate and promote experimentation and innovativeness in education and bringing confidence to society about relevance of Institute in terms of Social Impact various Students Motivation Program were organized in the reporting period. Under this program students from Shibli National College, Azamgarh (23 February, 2016), SAAII College of Medical Science And Technology, Kanpur (03 March, 2016), SR Group of Institutions, Lucknow (6 April 2016), Vidyagyan Public School Sitapur (5 July, 2016), Lucknow Public College, Lucknow (28 July, 2016), Sagar Public School, Bhopal (27 September, 2016), Bhavdiya Institute of Pharmaceutical Sciences and Research, Faizabad (29 September, 2016), MPCST, Bhopal (20 October, 2016), Avadh International School, Faizabad (04 November, 2016), Department of Zoology, University of North Bengal, Siliguri, Darjeeling (16 November 2016), Kasturba Gandhi Balika Vidyalaya, Chittaura Block, Bahraich, (29 November 2016) and Sainik School Rewa, MP (13 December, 2016) participated. The objective of the programs was to motivate them to pursue their career in Science and explore the knowledge of Drug Discovery and Research. The students along with their faculties visited different laboratories and experience the experimentation and day-to-day functioning and interacted with the scientists.

Health Awareness and Outreach Programs for Rural Areas

With this motto of *"Affordable healthcare for all"*, the knowledge generated at CSIR-CDRI, since its inception can be used for the betterment of the society and can support implementation and strengthening of ongoing National Health Program of Govt. of India through generating awareness towards Health and Science in rural India under aegis of *Swasth Bharat-Sashak Bharat Mission.* To fulfill this objective, CSIR-CDRI, Lucknow time to time do health awareness programs in villages on different disease areas related to health as per its mandate. In this series, in the leadership of Dr Sanjeev Yadav and Dr Anil Gaikwad, a group of 10 members organized a Health Awareness program on Diabetes in Junior High School at Village-Kathwara, Tahsil- Bakshi Ka Talab Kathwara, Distt.-Lucknow on 2 May, 2016. Around 200 persons participated in this awareness program. Students and their parents and teachers of all 22 Schools under this Sankul were participated and take the benefit of knowing the disease. Another health awareness program on Diabetes and Blood Pressure was organized by the team of scientists' including Drs Sharad Sharma, Anil Gaikwad, Akhilesh Tamrakar and Sanjeev Yadav along with research scholars in the Junior High School at Village-Singhamau, Distt. Lucknow on July 26, 2016. More than 250 participants including the Teachers and students along with their parents participated in this program.

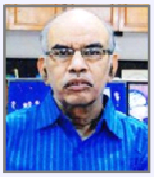
Showcasing of Institute's achievements in various Festivals & Exhibitions

To connect the science with society, CSIR-CDRI, Showcased its R&D activities and products in various Festival & Exhibitions. Participated in Swadeshi Mela 2016 at Varanasi (6-15 February, 2016), 7th Science Expo at Regional Science city, Lucknow (7-9, February 2016), National Family Planning Summit-2016 (New Choices, New Horizons), organized by Family Planning Division, MoH & FW, GoI, New Delhi (4-5 April, 2016). India International Innovation Fair, organized by IFIA, at GBIEC, Bengaluru (9–12 September, 2016), District level Science Exhibition at City Montessori School, Gomti Nagar, Lucknow (22 October, 2016), Generic & Healthcare Pavilion of CSIR at India International Trade Fair -2016, Pragati Maidan, New Delhi(13-27 November, 2016), Healthcare Pavilion of CSIR in India International Science Festival (IIFS-2016) at NPL, New Delhi (07-11 December, 2016). 104th Indian Science Congress Exhibition at Shri Venkateswara University, Tirupati (3-7 January, 2017) and Kisan Mela at CSIR-CIMAP, Lucknow (31 January, 2017). A large number of eminent personalities, students and common man from different area visited & interacted with CSIR-CDRI team and discussed about the R&D activities in CSIR & CDRI.

Distinguished Visitor

	Speaker & Address	Title of Lecture	Date
	**Dr Varadharajan Sundaramurthy**, Natioal Center for Biological Science, Bengaluru	Targeting host pathways to fight intracellular pathogens	19.02.2016
	**Prof. Lutz Ackermann** Georg-August-Universitat Gottingen, Germany	Catalytic functionalizations of unactivated C-H bonds	24.02.2016
	**David A. Wink Jr.** Center for Cancer Research, National Cancer Institute, Fredrick, MD, USA	Nitric Oxide in Cardiovascular disease and Cancer	29.02.2016
	**Prof. Subrata Ghosh** Department of Organic Chemistry Indian Association for the Cultivation of Science, Kolkata	Olefin Metathesis in Natural Product Synthesis	7.03.2016
	**Dr Arun Kumar Haldar** Department of Molecular Genetics and Microbiology and Immunology, Duke University Medical Centre, Durham, NC, USA	The Molecular "Kiss of Death": Finding the enemy within-how cells recognize and respond to a microbial pathogen hidden in a vacuole.	10.03.2016
	**Dr Pankaj Seth** Molecular and Cellular Neuroscience Neurovirology Section, National Brain Research Centre (NBRC) Manesar, Haryana	A novel model system to study Gila-Neuronal interaction	11.03.2016
	**Dr Vinay Gupta** Head of Department Department of Public Health Density Facaulty of Dental Sciences, KGMU, Lucknow	Importance of oral health in diabetes	07.04.2016
	**Prof. Kanury V S Rao** Drug Discovery Research Centre Translational Health Science and Technology Institute, Faridabad	Deciphering the host-pathogen interplay in human macrophages infected with *Mycobacterium* tuberculosis	11.04.2016
	**Dr Richard Kelly** Managing Editor, Organic & Biomolecular Chemistry, MedChemComm, Molecular BioSystems and Natural Product Reports	Royal Society of Chemistry-Updates and recent statistics, peer review and few tips about manuscript writing	12.04.2016

	**Dr Bhavana Prasher** Scientist, CSIR-IGIB, New Delhi	Therapeutic aspects of Ayurveda for transnational outcomes: Leads from Ayurgenomics study	12.04.2016
	**Dr S K Mathur** Endocrinology Division, SMS Medical College, Jaipur	Molecular mechanism of Asian Indian Diabets	27.04.2016
	**Dr Uday Saxena** Reddy's Institute of Life Sciences	How are new medicines discoved-Journey from bench to bedside	05.05.2016
	**Prof. Rama S Verma** Department of Biotechnology Indian Institute of Technology Madras	Microarray analysis of Fanconi Anemia patients and identification of dysregulated pathways in Indian population	12.07.2016
	**Prof Sandeep Verma** Department of Chemistry, Indian Institute of Technology Kanpur	Approaches for Nitric Oxide release, Neuronal regeneration and inhibition of Insulin aggregation	20.07.2016
	**Prof Surya Kant Tripathi** Department of Pulmonary Medicine, KGMU, Lucknow	Tuberculosis: An overview and Clinician's perspective for TB Research	28.07.2016
	**Prof Diwan Singh** Department of Chemistry, University of Delhi, Delhi	Molecular hybrids: Innovative Approach of Drug Design	24.08.2016
	**Dr Jene-Pierre Majoral,** Director of Research Exceptional class, Emeritus Member of the European Academy, Polish and German (Gottingen) Academies of Sciences	Design and applications of Phosphorus Dendrimers in Nanomedicine	15.09.2016
	**Prof. Serge Mignani** Former Head of Medicinal Chemistry Department and Scientific Director (Sanofi), Université Paris Descartes, France	Nanotechnologies in general and phosphorus dendrimers in particular to treat cancers. Current situation and next steps	15.09.2016
	**Dr Yenuganti Vengala Rao** Leibniz Institute For Farm Animal Biology, Germany	Ovarian cell function during different pathophysiological condition	17.11.2016

	**Dr Amit Kumar Mitra** University of Minnesota, USA	Single-Cell analysis of targeted Transcriptome predicts drug sensitivity if individual cells within human myeloma tumors	1.12.2016
	**Dr Sandeep Dugar** Sphaera Pharma, Singapore	A Collabroative approach of Translating science to medicines: Partnership between Industry and Research Institute	05.12.2016
	**Mr Vikas Saraswat,** Saraswat & Co, New Delhi	An interactive session on IPR	06.12.2016
	**Dr U D Gupta** Saraswat & Co, New Delhi	An interactive session on IPR	06.12.2016
	**Dr Papri Banarjee,** Bio-Innovation & Entrepreneurship from Centre for Cellular & Molecular Platforms (C-CAMP), Bengaluru;	BIRAC BIG Scheme-10th Call; C-CAMP A BIG Partner	31.01.2017

Invited Lectures Delivered by Institute Scientists

Dr Shailja Bhattacharya

- Trehalose-6-phosphate-phosphatase of *Brugia malayi* shows promise as antifilarial vaccine candidate, at 6th CTDDR-2016, CSIR-CDRI, Lucknow, 25-28 February, 2016
- Use of Drug delivery systems in experimental filariasis, Plenary Lecture at 6th Indo-Japanese International Symposium on Overcoming Intractable Infectious Diseases Prevalent in Asian Countries, 23-24 September, 2016

Dr Anuradha Dube

- Management of VL with the therapeutic proteins, Indo-Brazil Symposium on the Biochemistry of Kinetoplastid Parasites**,** 20 September, 2016

Dr Ashim Ghatak

- Women and Heart Health and Cardiovascular Disease, 9th Annual Conference South Asian Chapter of American College of Clinical Pharmacology–Theme–Maternal & Child Health, Mumbai, 29 April, 2016

Dr AK Dwivedi

- Basic chromatographic and related Technique, PI Industries, Panoli, Gujrat, 18 Janurary, 2016
- Steps in Drug Discovery in India & Contributions of CSIR-CDRI, Bannari Amman Institute of Technology, Sathyamangalam, Tamil Nadu, 26 February, 2016
- Advances in Pharmaceutical Drug Discovery and Development: Application of HPLC, Amity University, Lucknow, 02 August, 2016
- Drug Discovery: API to marketing, Indian Society of Chemists and Biologists (ISCB) Local Chapter: Udaipur, Mohan Lal Sukhadia University, Udaipur, 23 July, 2016
- Herbal Medicament (HM): A standardized hexane soluble fraction derived from *Curcuma longa* for management of CVS and CNS disorders, Pharmacological Research on Natural Products of Indian Origin, 26th Annual Conference of the Indian Pharmacological Society, West Bengal Branch, Kolkata, 17 December, 2016

Dr AK Sinha

- Natural Product-inspired development of Green Approaches towards synthesis of Phenolic based small molecules of Biological relevance, 3rd One Day Lecture Series in Chemistry, CSIR-NEIST, Jorhat, Assam, 29 November, 2016
- Natural and Unnatural Phenolic Based small molecules: Development of cost effective green synthetic approaches and their Biological evaluation, International Biennial Conference on Drug Discovery from Natural Products and Traditional Medicines (DDNPTM-2016), NIPER, Mohali, 18 November, 2016

Dr RK Singh

- Invention of a New Male antifertility Compound RISUG in India for 21st Century, Emerging Trends and Challenges in Pharmaceutical Industries, Kamla Nehru Institute of Management & Technology, Sultanpur, 13 April, 2016
- Recent Advances in Toxicology of New Compounds with Emphasis on RISUGadv, Amity Institute of Environmental Toxicological, Safety and Management at Amity University New Delhi/International Conference on New Insights & Multidisciplinary Approach in Toxicology Studies as 36th Conference of toxicology , 05 August, 2016
- Indian Agriculture and Environment, Department of Environmental Science, Bareilly College Bareilly on the occasion of world Ozone Day, National conference on Future Strategies to Conserve Ozone Layer, 16 September, 2016
- *Urvarkon Dwara Jaliya Jantu machhalion Par Hone Vale Dusprabhave, Prayaran Pradushan : Karan Avam Nivaran,* 21 October, 2016
- *Dawaow ki Khoj mein Vishaktata Parikshan Ka Mahatva*, CPWA Symposium on CSIR contribution in Health security during the last 25 years and futuristic vision, CSIR-NBRI, Lucknow, 19 March, 2016
- Genotoxic Evaluation of a new innovative molecule-RISUGadv having potential for prevention of Prostate Cancer, 37th National Annual Conference of Indian Association of Biomedical Scientists on Current Advances in Integrated Biomedicine for Health at Shobhit University, Meerut, 04 November, 2016
- Molecular Mechanism of Leukemia and Preventive Role of Phytomedicine, International Seminar on Recent Trandes and Experimental Approches in Science, Technology and Nature, CSIR-IITR, Lucknow, 24 December, 2016

Dr Neena Goyal

- Molecular characterization of antimony resistance in *Leishmania donoveni,* 6th International Conference on Current Trends in Drug Discovery and Research Delivered at CSIR-Central Drug Research Institute, Lucknow, 27 February, 2016
- Dipeptidyl carboxy peptidase: A novel target for drug discovery against visceral leishmaniasis, 26th National Congress of Parasitology, BHU, Varanasi, 22 January, 2016

Dr Jawahar Lal

- Population Pharmacokinetic modeling in optimizing drug development, Uka Tarsadia University, Surat, 07 February, 2016

Dr SK Rath

- Shaping Career as a life scientist, Utkal University, Bhubaneswar, 6 April, 2016
- Dissecting Cancer genome with modern tools, King George Medical University, Lucknow, 14 October, 2016
- Biotechnology for health care and the challenges, NIOT, Chennai, 22 October, 2016
- Biobanking, AMITY, Lucknow, 30 October, 2016
- Chromosomes, Lucknow University, 23 November, 2016

Dr Brijesh Kumar

- Direct analysis in real time mass spectrometry for rapid identification phytochemical and discrimination among plant species /parts to check adultration/substitution/variation, Department of Veterinary Pharmacology and Toxicology, UP Pt Deen Dayal Upadhyay Pashu Chikitsa Vigyan Vishwvidyalya Evam Go-Anusandhan Sansthan DUVASU), Mathura, 08 December, 2016
- LC-MS/MS a versatile tool for identification, characterization and quantitation of phytoconstituents for authentication and quality control of medicinal plant and products, Department of Veterinary Pharmacology and Toxicology, UP Pt Deen Dayal Upadhyay Pashu Chikitsa Vigyan Vishwvidyalya Evam Go-Anusandhan Sansthan DUVASU), Mathura, India, 09 December, 2016

Dr Amit Misra

- Why swallow TB medicine if you can Inhale?, All India Institute of Medical Sciences, New Delhi—"World TB Day", 29 March, 2016
- Quality by Design: Cost and Benefit, Tata Institute of Social Sciences, Mumbai- "Changing Pharmaceutical Manufacturing Environment and the Challenge of Affordable Quality Medicines", 13 July,2016
- Biosafety, Integral University, Lucknow, Extension Lecture, 20 September, 2016

Dr Atul Kumar

- Emerging Trends in Translation Research in India: Design and synthesis of anticancer agents, Shiv Nadar University, April 09, 2016

Dr Sanjay Batra

- Substrate-Controlled divergent synthesis of New Fused-β-Carbolines *via* Intramolecular Friedel-Crafts Reaction, ICOS-21, IIT Bombay, Mumbai, 14 December, 2016
- $I_2/NaNO_2$-mediated useful Synthetic Transformations, IISER, Pune, 14 October, 2016
- $I_2/NaNO_2$-mediated Novel Organic Transformations, INDIGO Conference 21-24 February 2016, organized by CBMR, Taj Vivanta, Lucknow, 21 February, 2016

Dr Atul Goel

- Donor-Acceptor Pyranone-derived Fluorescent Compounds for Organic Electronic Devices and Cell Imaging, International conference on Materials Engineering and Nanotechnology, Taipei, Taiwan, 21 May, 2016
- Pyranone-derived Fluores-cent compounds for Live Cell Imaging applications, Academia Sinica, Taipei, Taiwan, 24 May, 2016
- Diversity Oriented synthesis of Donor-Acceptor fluorescent compounds for Organic Electronic and Cell Imaging Applications, Hong Kong Baptist University, Hong Kong, 27 May, 2016
- Donor-Acceptor fluorescent compounds for Organic Electronic and Cell Imaging Applications, 19th CRSI National Symposium in Chemistry, University of North Bengal, Siliguri, 14 July, 2016
- Drug Research and Development activities at CSIR-CDRI, During Visit of Honourable President of the Republic of Mauritius Her Excellency Professor Ameenah Gurib-Fakim at National Botanical Research Institute (NBRI), Lucknow, 25 November, 2016

Dr Gautam Panda

- Amino acid chirons: a tool for asymmetric steroidal and nonsteroidals in quest for anticancer agents, International Conference on Organic Synthesis 21, IIT Mumbai, 13 December, 2016
- Amino Acids and Trisubstituted Methanes (TRSMs): Quest for Anticancer and Antitubercular agents, Indian JSPS Alumni Association, University of Mysore, Mysuru, 5 August, 2016

Dr T Narender

- Targeting Metabolic and Parasitic Diseases by Natural Products, Birla Institute of Technology (BIT), Meshra, Ranchi, 13 May, 2016
- Natural Products of Biological Importance from Indian Medicinal Plants, CDRI, Lucknow A half day Seminar on "Phytopharmaceuticals in Drug Discovery Research", 30 June, 2016
- Applications of NMR spectroscopy in Organic Chemistry, CDRI, Lucknow, National Workshop on applications of High-field NMR spectrometers in Drug discovery, 24 August, 2016
- Applications of NMR spectroscopy in Serendipitous Synthesis of Bioactive compounds, Delhi University, New Delhi, 23 September, 2016

Dr KR Arya

- Bio-prospecting of bone healing plants of Uttarakhand Himalaya for osteoprotective activity, National seminar on "Glimpses of Research Work in Taxonomy and Ethnobotany" CSIR-NBRI, Lucknow,15 November, 2016

Dr Bhupendra N Singh

- Harnessing the power of genomes: Pathways based assay systems and tuberculosis drug development, Zoology Department, Lucknow University, Lucknow, 23 November, 2016
- Sigma Factor and Biofilm formation in mycobacteria: An untold story, Jiwaji University, Gwalior, 19 November, 2016

Dr RK Tripathi

- Recent Advances In HIV/AIDS Drug Discovery And Development, Kalasalingam University, Krishnankoil, 27 December, 2016

Dr Arun K Trivedi

- Role of E3 ubiquitin Ligases in regulation of G-CSFR and its functions, 7th International Conference on Cancer and Stem Cells (ICSCC-2016), Goa, 21 October, 2016
- E3 ubiquitin Ligase Fbw7 targets CDX2 for ubiquitin-mediated degradation through two phosphodegron motifs in a GSK3b-dependent manner in colon cancer cells, 3rd International meet on advanced studies in cell signaling network (CeSiN-2016), IICB, Kolkata, 19 December, 2016

Dr Ravi Sankar Ampapathi

- Solution structural information of SIX3-Homedomain, IIT, Kharagpur, 22nd conference of National Magnetic Resonancr Society of India NMRS-2016, 20 February, 2016

Dr Kalyan Mitra

- Microscopic detection of autophagy and targeting this pathway for anti-cancer drug development, International Conference on Electron Microscopy, IIT-BHU, Varanasi, 03-June,2016

Dr Kishor Mohanan

- Domino Reactions involving the Bestmann-Ohira Reagent: A Swift entry to Drug Like Heterocycles, Domino Reactions involving the Bestmann-Ohira Reagent: A Swift entry to Drug Like Heterocycles, 29-31, July,2016

Dr Kumaravelu Jagavelu

- MAPKAPK2 regulates endothelial microparticle generation, Aligarh Muslim University, Aligarh, 06 March, 2016

Dr Prem N Yadav

- Next generation of antidepressants- "Kappa Opioids", CCMB, Haderabad at 30th annual meeting of SNCI, 9 December, 2016
- Advances in animal models of CNS disorders, NIPER Raebarely at Conference on current trends in Medicinal chemistry and pharmaceutical sciences in drug discovery, 18 March, 2016

Dr Rajender Singh

- Aldose reductase regulates blood testis barrier, ISSRF 2016, Ahmedabad, 20 Febaruary, 2016

Dr Rabi Sankar Bhatta

- Quantitative Analysis using LC-MS/MS, Small Molecule Analysis by NMR Spectroscopy & Mass Spectrometry, CSIR-CDRI, Lucknow, 21 September, 2016
- Quantitative analysis of phytopharmaceuticals, Analytical phytopharmaceutical chemistry by high performance liquid chromatography- mass spectrometry, CSIR-CDRI, Lucknow, 06 December, 2016
- Investigational New Drug (IND) Application, Analytical phytopharmaceutical chemistry by high performance liquid chromatography-mass spectrometry, CSIR-CDRI, Lucknow, 09 December,2016

Dr Satish Mishra

- Protein Kinase 9 regulates sexual reproduction in Plasmodium: A novel malaria transmission-blocking drug target, 40th Annual Conference of Indian Association of Medical Microbiologists , PGIMER, Chandigarh, India, 25 November, 2016
- *Plasmodium berghei* S14 is Essential for Gliding Motility and Infectivity of Sporozoites, International Conference on Cell Biology of Infections. National Centre for Biological Sciences, Bangalore, India, 14 October, 2016
- A Novel Protein-PbS14 is Essential for Gliding Motility and Infectivity of Plasmodium Sporozoites, National Conference on Malaria Parasite Biology: Drug Designing & Vaccine Development. Nirma University, Ahmedabad, India, 10 September, 2016

Dr Sanjeev K Shukla

- NMR-based Metabolomics to study the tissue specificity and seasonal variations in *Alstonia scholaris*, 22nd ISCB International Conference (ISCBC-2016), at Uka Tarsadia University, Surat, 6-8 February, 2016
- Applications of NMR Spectroscopy for structural characterization, National Workshop at GLA University, Mathura, 29 April, 2016
- NMR Spectroscopy: An Overview, During distinguished lecture series at DSMNR University, Lucknow, 3 August, 2016
- Applications of NMR Spectroscopy in Drug Discovery, National Conference on "Pharmacists: Caring for you" at Goel Institute

of Pharmacy & Sciences, Lucknow, 25 September, 2016

Dr Vivek Bhosale

- Ethics in Clinical research, Symposium on creating quality Health professionals: Goals barriers & opportunities At Hotel fairfield by Marriot, Lucknow organized by KGMU Lucknow 30 November,2016

Dr Wahajuddin

- Pharmacokinetic Endeavors in Antimalarial Drug Development, BioVision international conference at Lyon (France), 11-15 April,2016
- *In vitro* Detoxification Assessment of Bioactive Isoflavones in Rat and Human Liver Microsomes for Evaluating Safety, 16th International Conference of Biochemistry and Molecular Biology at Vancouver, Canada 17-21July,2016

Dr Rajesh Kumar Jha

- Receptive endometrium can utilize Integrin beta8 induced FAK and Vav-Rac1 signaling during embryo implantation process, 34th Annual Meeting of the Society for Reproductive Biology and Comparative Endocrinology and an International Symposium on Integrative Physiology and Comparative Endocrinology (ISIPCE)' at Department of Zoology, Banaras Hindu University, Varanasi, 12-14 February,2016
- ICAR sponsored short course entitled 'Optimizing Fertility in Live Stock of Hill Ecosystem Applying Modern Approaches', National Research Centre on Yak, Dirang, Arunachal Pradesh, 22-31 August, 2016

Dr Monika Sachdev

- Can Dysfunctional Gonads be rejuvenated through stem cell therapy?, National Training Program: Recent Advances in Fish Reproductive Biotechnology for Propagation of Endangered Species; organized by ICAR- National Bureau of Fish Genetic Resources, Lucknow, July 2016

Dr S Kar

- Tollip: an intracellular trafficking protein and dual negative regulator of TLR/IL-1R signalling in experimental visceral leishmaniasis, Indo-Brazil Symposium on the "Biochemistry of Kinetoplastid Parasites**",** 19 July, 2016

Dr Mrigank Srivastava

- Role of lung eosinophils and macrophages during Filarial manifestation of Tropical Pulmonary Eosinophilia, International Conference on Translational Biotechnology "Biosangam" 2016, held at MNNIT, Allahabad, 6 February, 2016

Dr Namrata Rastogi

- Exploiting the diazo group properties for developing novel reactions, 5th INDIGO Research Conference at Vivanta by Taj Hotel, Lucknow, 24 February,2016

Dr S R Kulkarni

- Various Mechanisms of IP Protection, Integral University, Lucknow 3 April, 2016.

Dr Sanjeev Yadav

- Biological screening facility and specialized R& D services CSIR-CDRI, Lucknow, at National workshop on Analytical Phytopharmaceutical Chemistry by High Performance Liquid Chromatography-Mass Spectrometry, CSIR-CDRI, Lucknow, 09 December, 2016

Visit and Deputations Abroad

Name of Scientist	Country of Visit	Purpose of Visit (Period of Deputation)
Mr Suman Kumar Mallik	Vietnam	To participate in Wiley Asia-Pacific Library Advisory Committee Meeting (24 May, 2016)
Dr Saman Habib	France	To attend the Fellowship Review Committee Meeting at the International Human Frontier Science Program Organization (18-20 January, 2016)
	France	To attend the Fellowship Review Committee meeting at The International Human Frontier Science Program Organisation (23rd to 25th January 2017)
Dr Neena Goyal,	Greece	To participate in annual meeting of project New Medicines for EU-FP7 Trypanosomatidic infections (NMTrp1) consortium (14-16th November 2016)
Dr Atul Goel	Taiwan Hong Kong	To participate in International conference on Materials Engineering and Nanotechnology (21- 24 May, 2016) To visit Department of Chemistry, Baptist University, Hong Kong for interaction with the faculties and for delivering a lecture (26 May, 2016)
Dr Mohammad Imran Siddiqi	Italy	To participate in Conference on Genome Architecture in Space and Time (20-24 June, 2016)
Dr Rajender Singh	USA	To undertake research at University of Alabama under SERB and Indo-US Science and Technology Forum (IUSSTF), (23rd Jan 2017 to 22nd Jan 2018)
Dr Aamir Nazir	Germany	To conduct research work at Albert Ludwigs University of Freiburg (10 March to 09 July, 2016)
Dr Smrati Bhadauria	Germany	To University of Leipzig, Leipzig, Germany under INSA, International Collaboration / Exchange Programme (16 June-13 September, 2016)
Dr Akhilesh Kumar Tamrakar	Canada	To conduct the research work at Mc Master University, Deptt.of Biochemistry and Biomedical Science Hamilton (08th December 2016 to 07th June 2017)
Dr Sidharth Chopra,	UK	To conduct research work under Chevening Rolls Royce Science, Innovation and Leadership Fellowship (CRISP), (13 April -24 June 2016)
Dr Kumaravelu Jagavelu,	Germany	To attend the Exchange of experience Global Bioimaging workshop (8-14 June, 2016)
Dr Wahajuddin	France Canada	To participate in the TWAS BIOVISION International conference at Lyon, France (12-14 April, 2016) To participate in the IUBMB 2016 conference (17- 21July, 2016)

Membership of Distinguished Committees /Boards/Societies

Dr Madhu Dikshit

Committee Member, (1) Council of Indian Academy of Sciences; (2) Sectional Committee (Health Sciences), Indian National Science Academy; (3) Academic Council, Jawaharlal Nehru University, New Delhi; (4) Core Member, Programme Advisory Committee on Health Sciences, SERB, DST (5) Scientific Advisory Committee (SAC), DBT-IISc Partnership Programme; (6) National Research Advisory Committee Meeting of National Innovation Foundation-India, Ahmadabad; (7) Steering Committee of NIPERs, Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers, Govt. of India; (8) Indian Council of Medical Research (Medical Sciences) PAC; (9) Council of Scientific Industrial Research (Organic & Medicinal Chemistry and Chemical Technology Res Committee); (10) Drug Technical Advisory Board, Directorate General of Health Services, DCGI, India; (11) Institute Body of Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow 2015-2019; (12) Expert Committee on Malaria Diagnostic and Chemotherapy and Prospects of Malaria Elimination in the Country; (13) Advisory-cum-Monitoring Committee of Biotech Park, Lucknow 2015-17 (14) Organic Chemicals, Alcohols & Allied Products Sectional Committee, PCD 09, Bureau of Indian Standards, New Delhi; (15) Advisory-cum-Monitoring Committee of Biotech Park, Lucknow; (16) Academic Standards Committee, NIPER; (17) Lucknow Management Association

Society member, (1) Indian Society of Free Radical Research; (2) International Society of Heart Research (Indian section); (3) Indian Pharmacological Society; (4) Society of Biological Chemists; (5) Indian Academy of Neurosciences, India; (6) UP association of Science and Technology; (7) National Academy of Sciences, India; (8) Indian Academy of Sciences; (9) National Academy of Medical Sciences, India; (10) The Cytometry Society of India; (11) Indian Society for Atherosclerosis Research; (12) Pulmonary Vascular Research Institute

Dr Ashim Ghatak

Member, (1)The American College of Clinical Pharmacology (MACCP) The Premier Academic Body of Clinical Pharmacology of USA; (2) The National Academy of Medical Sciences (MNAMS) The Most Premier Academic Body of Medical Sciences In India (3)CSIR RAB Core Committee Member For Selection Committee For Scientist Recruitment at CSIR-IICB Kolkata

Elected Councilor, Executive Committee of South Asian Chapter of American College of Clinical Pharmacology, Mumbai, India–2015-2016

Fellow, The Indian College of Physicians (F.I.C.P.) The Academic Body of Association of Physicians of India (API)

Dr A K Dwivedi

Member, (1) Standing Committee of Experts in Drugs Pricing Control, New Delhi (2) Drugs Panel for New Drugs Manufacturing Licenses, Directorate of Medical & Health Services, UP (3) Life Member, Indian Pharmaceutical Association (4) Life Member, Society of Biological Chemists, Bangalore (5) Life Member, UP Association for Advancement of Science & Technology

Joint Secretary, Indian Society of Chemists and Biologists. Lucknow.

Dr Naibedya Chattopadhyay

Editorial Advisory Board Member, (1) Biochemical Pharmacology (2) American Journal of Physiology Endocrinology and Metabolism (3) American Journal of Physiology Cell Physiology

Dr Arun K Sinha

Member, (1) Scientific Advisory Committee (SAC); (2) Centre of Innovative & Applied Bioprocessing (CIAB), Mohali, Punjab

Dr RP Tripathi

Member, (1) Joint Working Group (JWG) on Fragrance and Flavor (Ministry MSME Govt. of India) (2) Lab Research Council, DRDE (DRDO) Gwalior

Editorial Board Member, (1) ARKIVOC; (2) Journal of Organic Biological Chemistry

Dr Jawahar Lal

Member, (1) Editorial Board, American Journal of Modern Chromatography, USA; (2) Executive Member, Indian Society of Chemists and Biologists, Lucknow, India; (3) Editorial Advisory Board, Chemistry & Biology Interface

Dr DS Upadhyay

Member, (1) Live Stock Feed, Equipments and System, Sectional Committee, FAD, Bureau of Indian standard, New Delhi; (2) Veterinary Council India; (3) UP State Veterinary Council; (4) CPCSEA Sub Committee for Rehabilitation of Laboratory Animals; (5) Management Committee of the National Institute of Animal Welfare, Ministry of Environment & Forests, Govt. of India; (6) Institutional Animal Ethics Committees of CIMAP, IITR, Integral University, AH Dept., Saraswati Dental College & University, Amity University, Lucknow

Dr PMS Chauhan

General Secretary, ISCB

Member, Advisory Board Central University Gujarat

Dr Atul Kumar

Member, (1) Global Advisory Board member of SciFinder, Chemical Abstracts Service (CAS), American Chemical Society (ACS), Columbus , USA, (2)Technical Evaluation Panel (TEP), BIRAC, New Delhi

Dr Saman Habib

Member, (1) Animal Sciences Review Committee, CSIR, New Delhi; (2) Selection Committee for CSIR Nehru Post-doctoral Fellows (Life Sciences)

Dr R Ravishankar

Member, Working group on new TB drugs (WGND)

Dr Srikanta Kumar Rath

Member, (1) Review committee on Genetic manipulation, DBT, India (2) Sub-Committee on formulating biosafety guidelines to conduct and monitor

Confined Research Trials (CRTs) on genetically engineered (GE) (SPT) Rice, DBT, India (3) Committee for Safety and Tolerability of excipients used in parental formulation in Subsequent New Drug , DCG(I), FDA, New Delhi (4) Committee for use of PET in packaging of drug formulations for pediatric use, geriatric use and for use in case of women and women of reproductive age group, The Ministry of Health and Family Welfare (5) Academic council, JNU, New Delhi

Member, Editorial Board, Toxicology International

Dr Amit Misra

Member, (1) Indian Pharmaceutical Association (2) Organising Committee 5th Global Forum on TB Vaccines, New Delhi, India (3) UNDP Consultative Group on Biologicals and Biosimilars (4) Subject Expert Committee (Antimicrobial, Antiparasitic, Antifungal, Antiviral) of CDSCO advising DCGI for New Drug Approvals (5) Medical Biotechnology and Medical Nanotechnology Sectional Committee, (MHD 20) of the Bureau of Indian Standards, Government of India

Vice-President (India), Asian Federation for Pharmaceutical Sciences

Dr PK Shukla

Member, Steering Committee Member for NIPER, Ministry of Chemicals and Fertilizers, Gov. of India

Dr Sanjay Batra

Member, (1) Royal Society of Chemistry, UK (2) NOST, India (3) Governing Council, Chemical Research Society of India, Bengaluru (3) Project Advisory Committee for Chemical Sciences committee Fast Track, SERB-DST (4) ECRA/ NPDF PAC committee of SERB, NewDelhi

Associate Editor, RSC Advances, RSC, UK

Co-Chief Editor, Anti-infective Agents

Dr Neena Goyal

Member, Life member (1) Society of Biological Chemists, India (2) Indian Society for Parasitology, India

Dr Gautam Panda

Member, (1) National Academy of Sciences, Allahabad, India (2) Chemical Research Society of India

Dr K R Arya

Joint Secretary, Society of Ethnobotanists, National Botanical Research Institute, Lucknow

Member, Member in the panel of Project evaluation Committee, Department of Science & Technology (DST), New Delhi

Dr Bhupendra N Singh

Executive Member (Elected) All India Society Cell Biology

Dr Kumkum Srivastava

Executive Committee Member, Indian Society for Parasitology, India

Dr PR Mishra

Member Editorial Board, (1) Recent Patents in drug delivery and Formulations (Bentham Sciences) (2) Journal of Pharmaceutical and Biomedical Sciences

Founder Member, Indian Nanoscience Society.

Dr Atul Goel

Chairperson (Technical Session), XII Junior-NOST Conference (JNOST-2016)

Dr Manish K Chourasia

Member, BIRAC Expert Committee for CRS and BIG grants

Dr Rajender Singh

Member, Senate of Academy of Scientific & Innovative Research

Dr Arun K Trivedi

Member, Life member (1) Biotech research society of India (BRSI) (2) Indian association for cancer research (IACR)

Dr Monika Sachdev

Member, (1) Indian Society of Cell Biology, India; (2) Society for Frontiers in Reproduction, USA; (3) Society for study of Reproduction, USA; (4) Indian Society for the Study of Reproduction and Fertility (5) International Society of Transgenic Technology

Dr Mrigank Srivastava

Member, (1) Member of American Society for Microbiology, (2) Society for Leukocyte Biology

Dr Vivek Bhosale

Member, Institutional Ethics committee, CSIR-CIMAP (2) Institutional Ethics committee, State Ayurveda College, Lucknow

Dr Rabi Sankar Bhatta

Editorial Board Member, Journal of Drug Formulation and Production

Member, International Society for Study of Xenobiotics (ISSX), USA

Dr Jiaur R Gayen

Editorial Board Member, Journal of Endocrinology and Diabetes Research, UK

Life-Member, (1) Association of Biotechnology and Pharmacy, India (2) Indian Society for Mass Spectrometry (3) Indian Pharmacological Society (4) Society of Biological Chemists, India (5) The Indian Science Congress Association (6) Laboratory Animal Science Association of India (7) Society of Applied Biotechnology, India

Dr Wahajuddin

Member, Editorial Board, (1) Journal of Bioequivalence & Bioavailability; (2) Analytica Pharmaceutica Acta; (3) Pharmaceutical Regulatory Affairs

Life Member, National Academy of Sciences (India)

Dr Rajesh Kumar Jha

Member, (1) Indian Society for the Study of Reproduction and Fertility (ISSRF) (2) Society for the Study of Reproduction (SSR)

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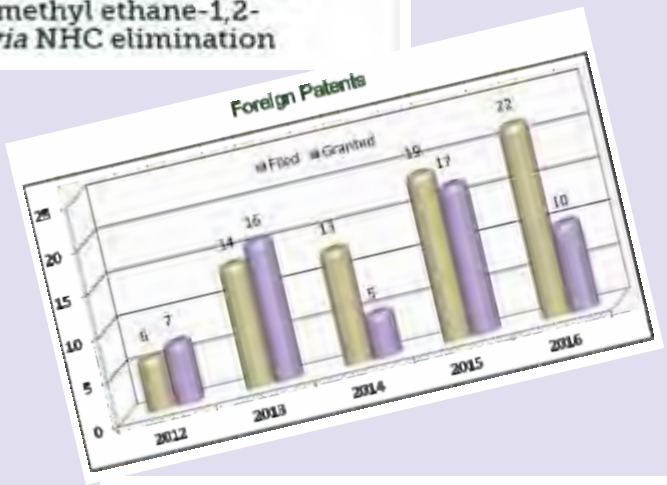
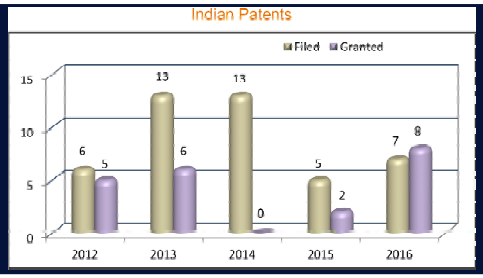
अनुसंधान उपलब्धियाँ



CSIR-Central Drug Research Institute, Lucknow

CSIR-Central Drug Research Institute, Lucknow



पेटेण्ट्स

विदेशों में स्वीकृत पेटेण्ट

1. **कोरियाई पेटेंट संख्याः 10-1686607** **आबंटन की तिथि :** 8.12.2016
   शीर्षक : सब्स्टिटुटेड बेन्जफरोक्रोमेनीज एंड रिलेटेड कंपाउंड्स फॉर द प्रिवेंशन एंड ट्रीटमेंट ऑफ बोन रिलेटेड डिसअ र्डर्स
   अन्वेषक : अतुल गोयल, अमित कुमार, सुमित चौरसिया, दिव्या सिंह, अबनीश कुमार गौतम, रश्मि पांडेय, ऋतू त्रिवेदी, मन मोहन सिंह, नैबेद्य चट्टोपाध्याय, लक्ष्मी मानिकावासगम, गिरीश कुमार जैन एवं अनिल कुमार द्विवेदी
   सहायक सदस्य : अब्दुल मलिक एवं अविनाश कुमार
2. **यूरोपियन पेटेंट संख्याः 2670722** **आबंटन की तिथि :** 12.10.2016
   शीर्षक : चिराल 3-अमिनोमिथाइलपाइपेरिडीन डेरीवेटिव ऐज इनहिबिटर्स ऑफ कोलेजन इंडुस्ड प्लेटलेट एक्टिवेशन एंड एधेशन
   अन्वेषक : दिनेश कुमार दीक्षित, मधु दीक्षित, तनवीर इरशाद सिद्दिकी, अनिल कुमार, रविशंकर भट्टा, गिरीश कुमार जैन, मनोज कुमार बर्थवाल, अंकिता मिश्रा, विवेक खन्ना, प्रेम प्रकाश, मनीष जैन, विशाल सिंह, वर्षा गुप्ता एवं अनिल कुमार द्विवेदी
   सहायक सदस्य : सुरेंद्र सिंह, सी पी पाण्डे, कांता भूटानी, एम एस अन्सारी एंव देवेंद्र सिंह
3. **चाइनीज पेटेंट संख्या : ZL200980152325.9** **आबंटन की तिथि :** 31.08.2016
   शीर्षक : सब्सीट्यूटेड बेन्जफरोक्रोमोन्स एंड रिलेटेड कंपाउंड्स फॉर द प्रिवेंशन एण्ड ट्रीटमेंट ऑफ बोन रिलेटेड डिसऑर्डर्स
   अन्वेषक : अतुल गोयल, अमित कुमार, सुमित चौरसिया, दिव्या सिंह, अबनीश कुमार गौतम, रश्मि पांडेय, ऋतू त्रिवेदी, मन मोहन सिंह, नैबेद्य चट्टोपाध्याय, लक्ष्मी मानिकावासगम, गिरीश कुमार जैन एवं अनिल कुमार द्विवेदी
   सहायक सदस्य : अब्दुल मलिक एवं अविनाश कुमार
4. **कोरियाई पेटेंट संख्या** **आबंटन की तिथि :** 02.08.2016
   शीर्षकः नावेल डोनर-एक्सेप्टर फ्लूरीन स्काफोल्डसःका प्रोसेस एंड यूजेज़ देयर ऑफ
   अन्वेषकः अतुल गोयल, सुमित चौरसिया, विजय कुमार, सुन्दर मनोहरं, रघुबीर सिंह आनंद
5. **जापानीज पेटेंट संख्याः 5957058** **आबंटन की तिथि :** 24.06.2016
   शीर्षकः *अल्मस वल्लीचियाना* प्लानचोन डेराइव्ड एक्सट्रेक्ट, डेसिग्नेटेड एज 'ओस्टेओएनाबॉल'' एंड इट्स कंपाउंड्स एम्प्लोयेड इन प्रिवेंशन ऑर ट्रीटमेंट ऑफ ऑस्टीओ-हेल्थ रिलेटेड डिसऑर्डर्स
   अन्वेषकः राकेश मौर्या, प्रीती रावत, कुणाल शरण, जावेद अख्तर सिद्दिकी, गौरव स्वर्णकार, गीतांजली मिश्र, लक्ष्मी मानिक्यावासगम, गिरीश कुमार जैन, कमल राम आर्य एवं नैबेद्य चट्टोपाध्याय
6. **जर्मन पेटेंट संख्याः 1807408** **आबंटन की तिथि :** 08.06.2016
   शीर्षक : ऑक्सि-सब्सीट्यूटेड फ्लावोन्स एज एन्टीहाइपरग्लाइसमिक एंड एंटीडिस्लिपिडेमिक एजेंट्स
   अन्वेषक : राम प्रताप, मवुरापु सत्यनारायण, चन्देश्वर नाथ, राम रघुबीर, अंजू पूरी, रमेश चंद्र, प्रीति तिवारी, बृजेंद्र कुमार त्रिपाठी एवं अरविन्द कुमार श्रीवास्तव
   सहायक सदस्यः अशोक कुमार खन्ना
7. **फ्रेंच पेटेंट संख्याः 1807408** **आबंटन की तिथि :** 08.06.2016
   शीर्षक : ओक्सि सब्सीट्यूटेड फ्लावोन्स एज एन्टीहाइपरग्लाइसमिक एंड एंटीडिस्लिपिडेमिक एजेंट्स
   अन्वेषक : राम प्रताप, मवुरापु सत्यनारायण, चन्देश्वर नाथ, राम रघुबीर, अंजू पूरी, रमेश चंद्र, प्रीति तिवारी, बृजेंद्र कुमार त्रिपाठी एवं अरविन्द कुमार श्रीवास्तव
   सहायक सदस्यः अशोक कुमार खन्ना
8. **स्वीडिश पेटेंट संख्या : 1807408** **आबंटन की तिथि :** 08.06.2016
   शीर्षक : ऑक्सि-सब्सीट्यूटेड फ्लावोन्स एज एन्टीहाइपरग्लाइसमिक एंड एंटीडिस्लिपिडेमिक एजेंट्स
   अन्वेषक : राम प्रताप, मवुरापु सत्यनारायण, चन्देश्वर नाथ, राम रघुबीर, अंजू पूरी, रमेश चंद्र, प्रीति तिवारी, बृजेंद्र कुमार त्रिपाठी एवं अरविन्द कुमार श्रीवास्तव
   सहायक सदस्य : अशोक कुमार खन्ना
9. **ग्रेट ब्रिटेन पेटेंट संख्या : 1807408** **आबंटन की तिथि :** 08.06.2016
   शीर्षक : ऑक्सि-सब्सीट्यूटेड फ्लावोन्स एज एन्टीहाइपरग्लाइसमिक एंड एंटीडिस्लिपिडेमिक एजेंट्स
   अन्वेषक : राम प्रताप, मवुरापु सत्यनारायण, चण्डीश्वर नाथ, राम रघुबीर, अंजू पूरी, रमेश चंद्र, प्रीति तिवारी, बृजेंद्र कुमार त्रिपाठी एवं अरविन्द कुमार श्रीवास्तव
   सहायक सदस्य : अशोक कुमार खन्ना

10. **यूनाइटेड स्टेट्स ऑफ अमेरिका पेटेंट संख्या : 9327009** **आबंटन की तिथि :** 03.05.2016
शीर्षक : पेप्टाइड इनहिबिटर्स एज नावेल एंटी-एचआईवी थेराप्यूटिक्स
अन्वेषक : राज कमल त्रिपाठी, बलवंत कुमार, रविशंकर रामचंद्रन, जीतेन्द्र कुमार त्रिपाठी, स्मृति भदौरिया एवं जीमुत काँती घोष

विदेशों में आवेदित पेटेण्ट

1. **यूरोपियन एप्लीकेशन संख्या : 15744364.9** **आवेदन की तिथि :** 09.12.2016
शीर्षक : कैटिओनिक लिपिड कॉर्डियरिमिड हाइब्रिड कंपाउंड्स एंड ए प्रोसेस फॉर प्रिपरेशन देयर ऑफ
अन्वेषक : बथुला सुरेंदर रेड्डी, वीकेके दुर्गा राव, कोमल शर्मा, एम प्रताप रेड्डी, दिबयेन्दु बनर्जी एवं दीपेंद्र कुमार सिंह
2. **यूनाइटेड स्टेट्स ऑफ अमेरिका एप्लीकेशन संख्या : 15/317,294** **आवेदन की तिथि :** 08.12.2016
शीर्षकः कैटिओनिक लिपिड कॉर्डियरिमिड हाइब्रिड कंपाउंड्स एंड ए प्रोसेस फॉर प्रिपरेशन देयर ऑफ
अन्वेषक : बथुला सुरेंदर रेड्डी, वीकेके दुर्गा राव, कोमल शर्मा, एम प्रताप रेड्डी, दिबयेन्दु बनर्जी एवं दीपेंद्र कुमार सिंह
3. **श्री लंका एप्लीकेशन संख्या : 18980** **आवेदन की तिथि :** 09.09.2016
शीर्षक : अ फार्मूलेशन यूजफुल फॉर डिलीवरी ऑफ न्यूरो प्रोटेक्टिंग एजेंट
अन्वेषक : अनिल कुमार द्विवेदी, हफ़सा अहमद, किरण कुमार खंडेलवाल, नीलम सिंह सांगवान, जियाउर रहमान गाईन, स्मृति भदौरिया, श्रीकांत कुमार रथ, शरद शर्मा, राकेश शुक्ल, एस पी एस गौर, विवेक विद्याधर भोसले, राजेंदर सिंह सांगवान एवं सारिका
सहायक सदस्य : शीबा साजी शैमुएल, पी के अग्निहोत्री, नवोद्यम कलेति, अनुराग कुमार श्रीवास्तव एवं अनुपमा
4. **साउथ अफ्रीकन एप्लीकेशन संख्या : 2016/05764** **आवेदन की तिथि :** 18.08.2016
शीर्षक : अ फार्मूलेशन यूजफूल फॉर डिलीवरी ऑफ न्यूरो प्रोटेक्टिंग एजेंट
अन्वेषक : अनिल कुमार द्विवेदी, हफसा अहमद, किरण कुमार खंडेलवाल, नीलम सिंह सांगवान, जियाउर रहमान गईन, स्मृति भदौरिया, श्रीकांत कुमार रथ, शरद शर्मा, राकेश शुक्ल, एसपीएस गौर, विवेक विद्याधर भोसले, राजेंदर सिंह सांगवान एवं सारिका
सहायक सदस्य : शीबा साजी शैमुएल, पी के अग्निहोत्री, नवोद्यम कलेती, अनुराग कुमार श्रीवास्तव एवं अनुपमा
5. **जर्मन एप्लीकेशन संख्या : 05718507.60** **आवेदन की तिथि :** 08.06.2016
शीर्षकः ऑक्सि सब्स्टिटुटेड फ्लावोन्स एज एन्टीहाइपर ग्लाइसमिक एंड एंटीडिस्लिपिडेमिक एजेंट्स
अन्वेषक : राम प्रताप, मवुरापु सत्यनारायण, चण्डीश्वर नाथ, राम रघुबीर, अंजू पूरी, रमेश चंद्र, प्रीति तिवारी, बृजेंद्र कुमार त्रिपाठी एवं अरविन्द कुमार श्रीवास्तव
सहायक सदस्य : अशोक कुमार खन्ना
6. **फेंच एप्लीकेशन संख्या : 05718507.60** **आवेदन की तिथि :** 08.06.2016
शीर्षक : ऑक्सि सब्स्टिटुटेड फ्लावोन्स एज एन्टी हाइपरग्लाइसमिक एंड एंटीडिस्लिपिडेमिक एजेंट्स
अन्वेषक : राम प्रतापए मवुरापु सत्यनारायण, चन्डीश्वर नाथ, राम रघुबीर, अंजू पूरी, रमेश चंद्र, प्रीति तिवारी, बृजेंद्र कुमार त्रिपाठी एवं अरविन्द कुमार श्रीवास्तव
सहायक सदस्य : अशोक कुमार खन्ना
7. **स्वीडिश एप्लीकेशन संख्या : 05718507.60** **आवेदन की तिथि :** 08.06.2016
शीर्षक : ऑक्सि सब्स्टिटुटेड फ्लावोन्स एज एन्टी हाइपरग्लाइसमिक एंड एंटीडिस्लिपिडेमिक एजेंट्स
अन्वेषक : राम प्रताप, मवुरापु सत्यनारायण, चण्डीश्वर नाथ, राम रघुबीर, अंजू पुरी, रमेश चंद्रए प्रीति तिवारी, बृजेंद्र कुमार त्रिपाठी एवं अरविन्द कुमार श्रीवास्तव
सहायक सदस्य : अशोक कुमार खन्ना
8. **ग्रेट ब्रिटेन एप्लीकेशन संख्या : 05718507.60** **आवेदन की तिथि :** 08.06.2016
शीर्षक : ऑक्सि सब्स्टिटुटेड फ्लावोन्स एज एन्टीहाइपरग्लाइसमिक एंड एंटीडिस्लिपिडेमिक एजेंट्स
अन्वेषक : राम प्रताप, मवुरापु सत्यनारायण, चंडीश्वर नाथ, राम रघुबीर, अंजू पूरी, रमेश चंद्र, प्रीति तिवारी, बृजेंद्र कुमार त्रिपाठी एवं अरविन्द कुमार श्रीवास्तव
सहायक सदस्य : अशोक कुमार खन्ना
9. **यूनाइटेड स्टेट्स ऑफ अमेरिका एप्लीकेशन संख्या : 15/025864** **आवेदन की तिथि :** 29.03.2016
शीर्षक : 3, 7 डायएजाबाइसायक्लो (3.3.1), नोनेन कार्बोक्सिएमाड्स एंड प्रोसेस ऑफ प्रिपरेशन देयर ऑफ
अन्वेषक : दिनेश कुमार दीक्षित, अनिल कुमार, करुणाकरण ससिकला, मनोज बर्थवाल, अंकिता मिश्रा एवं मनीष जैन
10. **यूरोपियन एप्लीकेशन संख्या : 14759059.0** **आवेदन की तिथि :** 26.03.2016
शीर्षक : 3, 7 डायजाबाइसायक्लो (3.3.1), नोनेन कार्बोक्सिएमाड्स एंड प्रोसेस ऑफ प्रिपरेशन देयर ऑफ
अन्वेषक : दिनेश कुमार दीक्षित, अनिल कुमार, करुणाकरण ससिकला, मनोज बर्थवाल, अंकिता मिश्रा एवं मनीष जैन
11. **यूनाइटेड स्टेट्स ऑफ अमेरिका एप्लीकेशन संख्या : 15/024181** **आवेदन की तिथि :** 23.03.2016

शीर्षक : एन एंटीलयूकेमिक एजेंट यूज फुल फॉर इंडुसिंग डिफरेंसिएसन इन माइलॉयड ल्यूकेमिया सेल्स

अन्वेषक : पूजा पाल, सविता लोचब, जीतेन्द्र कुमार कनौजिया, सब्यसाची सान्याल एवं अरुण कुमार त्रिवेदी

12. **ब्राजील एप्लीकेशन संख्या : 112016004289-1** **आवेदन की तिथि** : 26.02.2016

शीर्षक : नावेल एरिल नैफ्थील मेथानोन ऑक्सीम(स) एंड प्रोसेस फॉर प्रिपरेशन देयर ऑफ

अन्वेषक : सब्यसाची सान्याल, अतुल कुमार, नैबेद्य चट्टोपाध्याय, जवाहर लाल, अरुण कुमार त्रिवेदी, दीपक दत्ता, श्रीकांत कुमार रथ, तहसीन अख्तर, शैलेंद्र कुमार धर द्विवेदी, मनीष यादव, बन्दना चक्रवर्ती, अभिषेक कुमार सिंह, जय शरण मिश्र, निधि सिंह एवं अनिल कुमार त्रिपाठी

13. **यूरोपियन एप्लीकेशन संख्या : 14786724.6** **आवेदन की तिथि** : 26.02.2016

शीर्षक : नावेल एरिल नैफ्थील मेथानोन ऑक्सीम (स) एंड प्रोसेस फॉर प्रिपरेशन देयर ऑफ

अन्वेषक : सब्यसाची सान्याल, अतुल कुमार, नैबेद्य चट्टोपाध्याय, जवाहर लाल, अरुण कुमार त्रिवेदी, दीपक दत्ता, श्रीकांत कुमार रथ, तहसीन अख्तर, शैलेंद्र कुमार धर द्विवेदी, मनीषा यादव, बन्दना चक्रवर्ती, अभिषेक कुमार सिंह, जय शरण मिश्र, निधि सिंह एवं अनिल कुमार त्रिपाठी

14. **यूएस एप्लीकेशन संख्या : 14/915194** **आवेदन की तिथि** : 26.02.2016

शीर्षक : नावेल एरिल नैफ्थील मेथानोन ऑक्सीम (स) एंड प्रोसेस फॉर प्रिपरेशन देयर ऑफ

अन्वेषक : सब्यसाची सान्याल, अतुल कुमार, नैबेद्य चट्टोपाध्याय, जवाहर लाल, अरुण कुमार त्रिवेदी, दीपक दत्ता, श्रीकांत कुमार रथ, तहसीन अख्तर, शैलेंद्र कुमार धर द्विवेदी, मनीषा यादव, बन्दना चक्रवर्ती, अभिषेक कुमार सिंह, जय शरण मिश्र, निधि सिंह एवं अनिल कुमार त्रिपाठी

15. **यूरोपियन पेटेंट संख्या : 14832930.3** **आवेदन की तिथि** : 02.02.2016

शीर्षक : अल्मोसाइड-ए-डेराइव्ड कंपाउंड फ्रॉम *अल्मस वल्लीचियाना* प्लान्कॉन यूज फॉर प्रिवेंशन और क्योर ऑफ मेटाबोलिक डिसीसेस

अन्वेषक : सान्याल सब्यसाची, नैबेद्य चट्टोपाध्याय, राकेश मौर्या, जियाउर रहमान गाईन, स्मृति भदौरिया, अरुण कुमार त्रिवेदी, अभिषेक कुमार सिंह, जय शरण मिश्र, रश्मि कुमारी, कुणाल शरण, मोहदण् परवेज खान, काइनात खान, निधि सिंह, शैलेंद्र कुमार धर द्विवेदी, मनीष यादव, प्रीति दीक्षित, देवेंद्र प्रताप मिश्र - शरद शर्मा

16. **यूनाइटेड स्टेट्स ऑफ अमेरिका पेटेंट संख्या : 14/909676** **आवेदन की तिथि** : 02.02.2016

शीर्षक : अल्मोसाइड-ए-डेराइव्ड कंपाउंड फ्रॉम *अल्मस वल्लीचियाना* प्लान्कॉन यूज फॉर प्रिवेंशन और क्योर ऑफ मेटाबोलिक डिसीसेस

अन्वेषक : सान्याल सब्यसाची, नैबेद्य चट्टोपाध्याय, राकेश मौर्या, जियाउर रहमान गाईन, स्मृति भदौरिया, अरुण कुमार त्रिवेदी, अभिषेक कुमार सिंह, जय शरण मिश्र, रश्मि कुमारी, कुणाल शरण, मो. परवेज खान, काइनात खान, निधि सिंह, शैलेंद्र कुमार धर द्विवेदी, मनीषा यादव, प्रीति दीक्षित, देवेंद्र प्रताप मिश्र - शरद शर्मा

17. **ब्राजीलियन एप्लीकेशन संख्या : BR112016002244.0** **आवेदन की तिथि** : 01.02.2016

शीर्षकः अल्मोसाइड-ए-डेराइव्ड कंपाउंड फ्रॉम *अल्मस वल्लीचियाना* प्लान्कॉन यूज फॉर प्रिवेंशन और क्योर ऑफ मेटाबोलिक डिसीसेस

अन्वेषकः सान्याल सब्यसाची, नैबेद्य चट्टोपाध्याय, राकेश मौर्या, जियाउर रहमान गाईन, स्मृति भदौरिया, अरुण कुमार त्रिवेदी, अभिषेक कुमार सिंह, जय शरण मिश्र, रश्मि कुमारी, कुणाल शरण, मो. परवेज खान, काइनात खान, निधि सिंह, शैलेंद्र कुमार धर द्विवेदी, मनीषा यादव, प्रीति दीक्षित, देवेंद्र प्रताप मिश्र - शरद शर्मा

18. **कनेडियन एप्लीकेशन संख्या : 2917921** **आवेदन की तिथि** : 20.01.2016

शीर्षक : फार्मास्यूटिकल कम्पोजीशन फॉर द ट्रीटमेन्ट ऑफ डिमिन्यूशन ऑफ बोन टिश्यू

अन्वेषक : ऋतू त्रिवेदी, पी आर मिश्रा, नीलम एस सांगवान, प्रबोध त्रिवेदी, दिव्या सिंह, राजेंद्र एस सांगवान, प्रियंका कुशवाहा, विक्रम खेदगीकर, सुलेखा अधिकारी, धर्मेंद्र चौधरी, ज्योति स्वरुप, अविनाश कुमार, अनिरुद्ध करवंडे, अश्वनी वर्मा एवं श्वेता शर्मा

सहायक सदस्य : नसीर अहमद

19. **यूरोपियन एप्लीकेशन संख्या : 14759347.9** **आवेदन की तिथि** : 20.01.2016

शीर्षक : फार्मास्यूटिकल कम्पोजीशन फॉर द ट्रीटमेन्ट ऑफ डिमिन्यूशन ऑफ बोन टिश्यू

अन्वेषक : ऋतू त्रिवेदी, पी आर मिश्रा, नीलम एस सांगवान, प्रबोध त्रिवेदी, दिव्या सिंह, राजेंद्र एस सांगवान, प्रियंका कुशवाहा, विक्रम खेदगीकर, सुलेखा अधिकारी, धर्मेंद्र चौधरी, ज्योति स्वरुप, अविनाश कुमार, अनिरुद्ध करवंडे, अश्वनी वर्मा एवं श्वेता शर्मा

सहायक सदस्य : नसीर अहमद

21. **पीसीटी एप्लीकेशन संख्या : PCT/IN2016/050019** **आवेदन की तिथि** : 15.01.2016

शीर्षक : अ नोवेल एंटिलेशमानिअल फार्मूलेशन

अन्वेषक : नीना गोयल, सोनाली गंगवार, अनिल कुमार कला सदन, सुभाशीष बिस्वास, अनिल कुमार द्विवेदी, हफसा अहमद, कैलाश चंद गुप्ता, प्रदीप कुमार, प्रियंका भटनागर एवं संजय बत्रा

सहायक सदस्य : कार्तिक रामलिंगम, वी सरवन कुमार

22. **यूनाइटेड स्टेट्स ऑफ अमेरिका एप्लीकेशन संख्या : 14/904981** **आवेदन की तिथि** : 14.01.2016

शीर्षकः फार्मास्यूटिकल कम्पोजीशन फॉर द ट्रीटमेन्ट ऑफ डिमिन्यूशन ऑफ बोन टिश्यू

अन्वेषक : ऋतू त्रिवेदी, पी आर मिश्रा, नीलम एस सांगवान, प्रबोध त्रिवेदी, दिव्या सिंह, राजेंद्र एस सांगवान, प्रियंका कुशवाहा, विक्रम खेदगीकर,

सुलेखा अधिकारी, धर्मेंद्र चौधरी, ज्योति स्वरुप, अविनाश कुमार, अनिरुद्ध करवंडे, अश्वनी वर्मा एवं श्वेता शर्मा

सहायक सदस्य : नसीर अहमद

23. **ऑस्ट्रेलियन एप्लीकेशन संख्या : 2014291615** **आवेदन की तिथि :** 12.01.2016

शीर्षक : फार्मास्यूटिकल कम्पोजीशन फॉर द ट्रीटमेन्ट ऑफ डिमिन्यूशन ऑफ बोन टिश्यू

अन्वेषक : ऋतू त्रिवेदी, पी आर मिश्रा, नीलम एस सांगवान, प्रबोध त्रिवेदी, दिव्या सिंह, राजेंद्र एस सांगवान, प्रियंका कुशवाहा, विक्रम खेदगीकर, सुलेखा अधिकारी, धर्मेंद्र चौधरी, ज्योति स्वरुप, अविनाश कुमारए अनिरुद्ध करवंडे, अश्वनी वर्मा एवं श्वेता शर्मा

सहायक सदस्य : नसीर अहमद

23. **यूनाइटेड स्टेट्स ऑफ अमेरिका एप्लीकेशन संख्या : 14/933843** **आवेदन की तिथि :** 05.11.2015

शीर्षक : चिराल 3-अमिनोमिथाइलपाइपेरिडीन डेरीवेटिव ऐज इनहिबिटर्स ऑफ कोलेजन इंडुस्ड प्लेटलेट एक्टिवेशन एंड एथेशन

अन्वेषक : दिनेश कुमार दीक्षित, मधु दीक्षित, तनवीर इरशाद सिद्दिकी, अनिल कुमार, रविशंकर भट्टा गिरीश कुमार जैन, मनोज कुमार बर्थवाल, अंकिता मिश्रा, विवेक खन्ना, प्रेम प्रकाश, मनीष जैन, विशाल सिंह, वर्षा गुप्ता एवं अनिल कुमार द्विवेदी

सहायक सदस्य : सुरेंद्र सिंह, सीपी पाण्डे, कांता भूटानी, एमएस अन्सारी एवं देवेंद्र सिंह

24. **यूनाइटेड स्टेट्स ऑफ अमेरिका एप्लीकेशन संख्या : 14/926771** **आवेदन की तिथि :** 29.10.2015

शीर्षक : नावेल डोलास्टेटिन मिमिक्स एज एंटीकैंसर एजेंट्स

अन्वेषक : तुषार काँति चक्रवर्ती, गजुला प्रवीण कुमार, दुलाल पांडा एवं जयन्त अस्थाना

भारत में स्वीकृत पेटेंट्स

1. **पेटेंट संख्या : 278183** **आबंटन की तिथि :** 15.12.2016

शीर्षक : सिंथेसिस ऑफ न्यु फ्लुकोनाजोल एनालॉग्ज़ कंटैनिंग 1,2,3-ट्राईजोल मोईएटी एंड हैविंग बेटर एंटिफन्गल स्पेक्ट्रम

अन्वेषक : नीलकंठ गणपत अहेर, वंदना सुधीर पोरे, मनोज कुमार भट, गड्डम बालकृष्ण शिवा केशव, अवनीत कुमार, नृपेंद्र नाथ मिश्र एवं प्रवीण कुमार शुक्ला

2. **पेटेंट संख्या रू 278079** **आबंटन की तिथि :** 13.12.2016

शीर्षक : अ नोवेल इन्हीबिटर व्हिच एक्ट्स बाय डिस्राप्टिंग एचआईवी-1 नेफ-पैक्स-ई प्रोटीन इंटरेक्शन्स मैन्टैनेड इन हेक-293 सेल्स आइडेंटिफाइड बाय ए न्यू मर्मेलियन टु-हाइब्रिड मॉडल

अन्वेषक : राज कमल त्रिपाठी, सुदीप्ति गुप्ता, धर्मशील, पंकज सिंह, ऋचा वर्मा, जीमुत काँति घोष एवं रविशंकर रामचंद्रन

3. **पेटेंट संख्या : 276287** **आबंटन की तिथि :** 10.10.2016

शीर्षकः एन इम्प्रूवड प्रोसेस फॉर प्रिपरेशन ऑफ ट्रान्स-3, 4-डायएरिलक्रोमेन

अन्वेषक : देवी प्रसाद साहू

सहायक सदस्य : आत्म प्रकाश द्विवेदी

4. **पेटेंट संख्या : 274841** **आबंटन की तिथि :** 11.08.2016

शीर्षक : हर्बल फार्मूलेशन्स फॉर लोकल कॉन्ट्रासेप्टिव

अन्वेषक : सत्यवान सिंह, अनिल कुमार द्विवेदी, राघवेन्द्र पाल, शेखर चंद्र शर्मा एवं गोपाल गुप्ता

5. **पेटेंट संख्या : 272087** **आबंटन की तिथि :** 16.03.2016

शीर्षक : मरकेप्टो फिनाइल नेप्थाइल मीथेन कंपाउंड्स एंड प्रिपरेशन देअरफोर

अन्वेषक : संगीता, कुमार अतुल, सिंह मन मोहन, जैन गिरीश कुमार, मूर्ति पुव्वाद श्री रामचंद्र एवं सुप्रभात रे

6. **पेटेंट संख्या : 271697** **आबंटन की तिथि :** 29.02.2016

शीर्षक : सब्स्टिटुटेड 6-(1-एरिल एथिल)-1, 2, 4-ट्राइऑक्जेन्स

अन्वेषक : चन्दन सिंह, अजित शंकर सिंह एवं सुनील कुमार पूरी

सहायक सदस्य : शशि रस्तोगी, अखिलेश कुमार श्रीवास्तव - कमलेश सिंह

7. **पेटेंट संख्या : 271474** **आबंटन की तिथि :** 23.02.2016

शीर्षकः नावेल सब्स्टिटुटेड बेन्जोसायक्लोअल्काइल अजोल डेरिवेटिव्स एज एन्टीलैश्मनिअल एजेंट्स

अन्वेषक : सत्यवान, कल्पना भंडारी, नागरिपु श्रीनिवास, श्रद्धा पलने, निशि एवं सुमन गुप्ता

सहायक सदस्य : अनूप कुमार श्रीवास्तव

8. **पेटेंट संख्या : 271422** **आबंटन की तिथि :** 19.02.2016

शीर्षक : नावेल लिपोफिलिक ईथर डेरिवेटिव्स ऑफ डिहाइड्रो आर्टेमिसिनिन एस एन्टीमलेरियल्स

अन्वेषक : चन्दन सिंह, संदीप चौधरी एवं सुनील कुमार पूरी

सहायक सदस्य : शशि रस्तोगी एवं अखिलेश कुमार श्रीवास्तव

भारत में आवेदित पेटेंट्स

1. **पेटेंट एप्लीकेशन संख्या : 201611022640** **आवेदन की तिथि :** 01.07.2016

शीर्षक : फार्मास्यूटिकल कम्पोजीशन फॉर द प्रिवेंशन एंड/ऑर ट्रीटमेंट ऑफ बोन रिलेटेड डिसऑर्डर्स

अन्वेषक : ऋतू त्रिवेदी, प्रभात रंजन मिश्रा, सुलेखा अधिकारी, नसीर अहमद, धर्मेंद्र चौधरी, नरेश मिट्टापेल्ली, सुधीर कुमार, कपिल देव एवं राकेश मौर्या

सहायक सदस्य : सतीश चंद्र तिवारी

2. **पेटेंट एप्लीकेशन संख्या : 201611010438** **आवेदन की तिथि :** 28.03.2016

शीर्षक : पैंक्रियास्टेटिन इन्हिबिटेरी पेप्टाइड्स फॉर द ट्रीटमेन्ट ऑफ डायबिटीज

अन्वेषक : जियाउर रहमान गाईन, गुरु राघवेन्द्र वलिचेरला, जाकिर हुसैन, आनंद प्रकाश गुप्ता, सैयद अनीस अहमद, रियाजुद्दीन मुहम्मद, मोहम्मद इमरान सिद्दीकी एवं शरत चन्द्र

3. **पेटेंट एप्लीकेशन संख्या : 201611009674** **आवेदन की तिथि :** 21.03.2016

शीर्षक : अ हेरिटैबल एंड इंडूसीबिल आरएएनआइ नॉकडाउन सिस्टम इन *लैश्मनिया ब्राजीलिएंसिस*

अन्वेषक : अमोघ अनंत सहस्रबुद्धे एवं निरंजन कुमार वेळुरू

सहायक सदस्य : राजेंद्र कुमार श्रीवास्तव

4. **पेटेंट एप्लीकेशन संख्या : 201611009443** **आवेदन की तिथि :** 18.03.2016

शीर्षक : सेल सेलेक्टिव पेप्टाइड हैविंग एंटीबैक्टीरियल एंड एंटी-एंडोटॉक्सिन प्रॉपर्टीज

अन्वेषक : जीमुत काँति घोष, अमित कुमार त्रिपाठी, अमित कुमार, अंशिका टंडन, प्रवीण के शुक्ला, अतुल कृष्ण, जीतेन्द्र कुमार त्रिपाठी, रबी शंकर भट्टा एवं संतोष कुमार पुत्तरेवु

5. **पेटेंट एप्लीकेशन संख्या : 201611003055** **आवेदन की तिथि :** 28.01.2016

शीर्षक : एन इम्प्रूव्ड़ प्रोसेस फॉर प्रिपरेशन ऑफ 4-सब्सिट्यूटेड एमिनो-2, 3-पॉली मिथाइलीनक्वीनोलिन हाइड्रोक्लोराइड

अन्वेषक : मंडलपु धनराजु, राजेश कुमार अरिगेला, तारा रावत एवं विष्णु लाल शर्मा

सहायक सदस्य : रामजीत

6. **पेटेंट एप्लीकेशन संख्या : 201611003053** **आवेदन की तिथि :** 28.01.2016

शीर्षक : यूटेक्टिक फार्मूलेशन ऑफ माइग्रेनोलाइटिक फॉर रैपिड नोज-टू-ब्रेन ट्रांसपोर्ट

अन्वेषक : राजीव रंजन एवं प्रेम नारायण यादव

सहायक सदस्य : अमित मिश्रा एवं तबस्सुम खान

7. **पेटेंट एप्लीकेशन संख्या : 201611002387** **आवेदन की तिथि :** 22.01.2016

शीर्षक : ए कंट्रोल्ड रिलीज फार्मूलेशन फॉर एनहांस्ड ओरल बायोअवैलेबिलिटी ऑफ हाइड्रोफोबिक ड्रग

अन्वेषक : मनीष कुमार चौरसिया, पंकज कुमार सिंह, कवित्त रावल, विवेक कुमार पवार, हनुमंत श्रीकंठ चेरुवु, जियाउर रहमान गाईन एवं अनिल कुमार द्विवेदी

8. **पेटेंट एप्लीकेशन संख्या : 3988DEL2015** **आवेदन की तिथि :** 08.12.2015

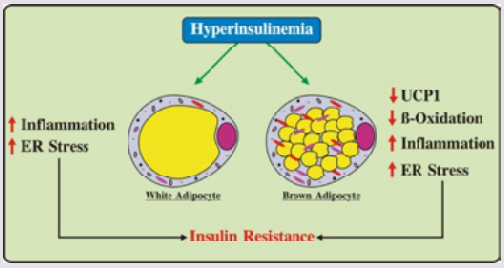
शीर्षक : 6/8((डाई(हेटेरो-2-यलमेथील)/एमिनो) मिथाइल)-7-हाइड्रॉक्सिल-4-(मेथिलथिओ)-2-ऑक्जो-2एच-क्रोमीन-3-कार्बोनोट्रिल्स एंड यूजेस देयर ऑफ

अन्वेषक : अतुल गोयल, अजय कुमार झा, आशुतोष रघुवंशी, राकेश कुमार आर्य एवं दीपक दत्ता

9. **पेटेंट एप्लीकेशन संख्या : 3891DEL2015** **आवेदन की तिथि :** 30.11.2015

शीर्षक : 6-सब्स्टिटुटेड -7-हाइड्रोक्सी-4-(मेथिलथिओ)-2-ऑक्जो-2एच-क्रोमीन-3-कार्बोनाइट्राइस्ल एम फ्लोरेसेंट डाइज एंड यूजेस देयर ऑफ

अन्वेषक : अतुल गोयल, आशुतोष रघुवंशी, अजय कुमार झा, मनोज कथूरिया एवं कल्याण मित्रा



वैज्ञानिक सम्मेलनों में प्रस्तुत शोध पत्र

2016

103 वाँ इण्डियन साइन्स काँग्रेस 2016, मैसूर विश्वविद्यालय, मैसूर (3-7 जनवरी)

- क्लोनिंग, एक्सप्रेशन ऐण्ड कैरेक्टराइज़ेशन ऑफ़ रेक ए फ्रॉम *वॉलबैचिया* इन्डोसिम्बॉएन्ट ऑफ़ लिम्फ़ैटिक फ़ाइलेरियल पैरासाइट *ब्रूजिया मलाइ,* ममता गंगवार, रूचि झा, शैलजा मिश्रा-भट्टाचार्य
- ट्रेहलोज़-6 फ़ॉस्फ़ेट-फ़ॉस्फ़ेट ऑफ *ब्रूजिया मलाइ* : ए प्रॉमिसिंग ऐण्टीफ़ाइलेरियल वैक्सीन कैन्डीडेट, शैजला मिश्रा भट्टाचार्या

इण्टरनैशनल कॉन्फ्रेन्स ऑन ऐडवान्सेज़ इन एशियन मेडिसिन, को-ऑर्गनाइज़्ड बाई भारतीय विद्यापीठ ऐण्ड सोसायटी फ़ॉर एथनोफ़ार्माकॉलोजी, पुणे, महाराष्ट्र, भारत (4-7 जनवरी)

- फ़ॉस्फ़ोलिपिड कॉम्प्लेक्सेशन ऑफ़NMITLI118RT + (ए स्टैन्डर्डाइज़्ड एक्सट्रैक्ट ऑफ़ ए न्यू केमोटाइप ऑफ़ *विथैनिया सोम्नीफ़ेरा* टुनल) : वे टु ए प्रूडेन्ट थेराप्यूटिक ऐप्रोच फ़ॉर बेनीफ़िशियल आउटकम्स इन इश्चमिक स्ट्रोक इन रैट्स, अभिषेक आर्या, हफ़्ज़ा अहमद, सतीश अग्रवाल, अनिल कुमार द्विवेदी
- हेस्पेरेटिन एनहैंस्ड बाइकैल्युटैमाइड इन्ड्यूज़्ड माइटोकॉन्ड्रियल मेम्ब्रेन डिपोलराइज़ेशन इन प्रॉस्टेट कैन्सर सेल्स : ए फ़ार्माकोकाइनेटिक ऐण्ड टॉक्सिसिटी एनालिसिज़, अभिषेक आर्या, हफ़्ज़ा अहमद, सतीश अग्रवाल, अनिल कुमार द्विवेदी

एस एफ आर आर - इण्डिया 2017 की पन्द्रहवीं वार्षिक बैठक ''रेडिएशन ऐण्ड रिडॉक्स प्रॉसेस इन हेल्थ'' पर सम्मेलन और एक दिवसीय स्कूल, मुम्बई, (9-12 जनवरी)

- इवैल्युएशन ऑफ़ कम्पैरेटिव प्रोटेक्टिव इफ़ेक्ट ऑफ़ क्वर्सेटिन, रूटिन, ऐपिजेनिन, नैरिजिन, क्लोरोजेनिक ऐसिड ऐण्ड रिज़वेरेट्रॉल ऑन एचटी-29 सेल्स, साक्षी मिश्रा, एस श्रीवास्तव, पी के पाण्डे, जे देवंगन, ए दिवाकर, एस के रथ

इण्टरनैशनल कॉन्फ्रेन्स ऑन कार्डियोवैस्कुलर ट्रान्सलेशनल रिसर्च, आइ आइटी मद्रास (22-24 जनवरी)

- इफेक्ट ऑफ़ डिफ़रेन्ट कैलोरी डाइट्स ऑन द मेटाबोलिक स्टेटस ऑफ़ P47फॉक्स नॉकआउट माइस, एन कनूरी, एस सी रिबेलो, जे एस कांशना, जे आर गाइन, जे कुमार वेलु, मधु दीक्षित
- ऐन्जियोटेन्सि 11 पोटेन्शिएट्स द लेफ़्ट वेन्ट्रिकल रिमॉडलिंग प्रॉसेस इन द हाई फ़ैट डायट फेड माइस, एस एस रेड्डी, अनन्त जैसवाल, प्रीति मौर्या, एम के बर्थवाल
- इन्टरल्युकिन-1 रिसेप्टर एसोसिएटेड काइनेज़ मीडिएट्स ऐन्जियोटेन्सिन 11 इन्ड्यूज़्ड वैस्कुलर स्मूद मसल सेल्स प्रॉलिफ़रेशन, प्रीति मौर्या, एस एस रेड्डी, एम के बर्थवाल
- इफ़ेक्ट ऑफ़ सीडीआर-267-एफ़ 018 अगेन्स्ट डिस्लिपिडेमिया इन्ड्यूज़्ड कार्डियोवैस्कुलर कॉम्प्लीकेशन्स इन ApoE KO ऐथरोस्क्लेरॉटिक मॉडल कांशना जे एस, रिबेलो एस सी, पाठक पी, नागेश्वरराव के, एम एन श्रीवास्तव, टी नरेन्दर, ए के द्विवेदी, कुमार वेलु जे, एम के बर्थवाल, और एम दीक्षित
- इफ़ेक्ट ऑफ डिफरेन्ट कैलोरी डायट्स ऑन द मेटाबोलिक स्टेटस ऑफ़ p47^{Phox} नॉक आउट माइस, नागेश्वराराव कनूरी, संजय सी रिबेलो, जितेन्द्र एस कांशना, प्रिया पाठक, आनन्द पी गुप्ता, जियाउर आर गाइन, कुमारवेलु जे और मधु दीक्षित

ड्रग डिस्कवरी फ़ॉर पैरासिटिक डिज़ीज़ेज़ - कीस्टोन सिम्पोज़िया ऑन मॉलीक्युलर ऐण्ड सेल्युलर बायोलॉजी कैलिफ़ोर्निया, यूएसए (24-28 जनवरी)

- प्रोबिंग द फंक्शन ऑफ़ ऐसपार्टिल प्रोटियाज़ेज़, प्लाज़मेपिसन VII ऐण्ड VIII इन *प्लाज़मोडियम बर्गी,* बाबू एस मस्तान, संदीप डे, सतीश मिश्रा और कोटा अरून कुमार

काकतिया विश्वविद्यालय वारंगल, तेलंगाना (28-30 जनवरी)

- ट्रेहलोज़-6 फ़ॉस्फ़ेट-फ़ॉस्फ़ेट ऑफ *ब्रूजिया मलाइ* : ए प्रॉमिसिंग ऐण्टीफ़ाइलेट्रियल वैक्सीन कैन्डीडेट'', शैलजा मिश्रा भट्टाचार्या

22 वाँ आईएससीबीसी-2016 ऑन रीसेन्ट ट्रेन्ड्स इन अफ़ोर्डेबल ऐण्ड सस्टेनेबल ड्रग डिस्कवरी ऐण्ड डिवेलपमेन्ट्स, विश्वविद्यालय, सूरत (06-08 फरवरी)

- पॉपुलेशन फ़ार्माकोकाइनेटिक्स मॉडलिंग इन ऑप्टिमाइज़िंग ड्रग डिवेलपमेन्ट, जे लाल

माइटोकॉन्ड्रिया इन हेल्थ ऐण्ड डिजीज़ पर छठा वार्षिक अन्तर्राष्ट्रीय सम्मेलन जे एन यू, नई दिल्ली (10-11 फरवरी)

- रेगुलेशन ऑफ़ माइटोकॉन्ड्रियल प्रोटीन्स ड्यूरिंग इन्ट्रासेल्युलर सर्वाइवल ऑफ़ माइकोबैक्टीरिया, रिकेश के दुबे, आलोक के मिश्रा, शिवाजी एम यबाजी और किशोर के श्रीवास्तव

34वीं ऐनुअल मीटिंग ऑफ़ द सोसाइटी फ़ॉर रिप्रोडक्टिव बायोलॉजी ऐण्ड कम्पैरेटिव एण्डोक्राइनोलॉजी (SRBCE) इण्टरनेशनल सिम्पोज़ियम ऑन इण्टीग्रेटिव फ़िजियोलॉजी एण्ड कम्परेटिव इन्डोक्राइनोलॉजी एंलॉग विद ब्रेन स्टॉर्मिंग सेशन ऑन जेनो-ईको-न्यूरोइन्डोक्राइनोलॉजी, बीएचयू, वाराणसी, भारत (12-14 फरवरी, 2016)

- करक्यूमिन ऐटीन्युएट्स सेल्युलर प्रॉलीफ़रेशन इन इण्डोमीट्रियल कार्सिनोमा सेल्स वाया ROS मीडिएटेड ऐक्टिवेशन ऑफ़ ग्रोथ अरेस्ट एण्ड DNA डैमेज इनड्यूसिबल जीन153/CEBP होमोलॉजी प्रोटीन (GADD153/CHOP) विजय के सिरोही, पी पॉपली, पी शंखवार, जे वी कौशल, के गुप्ता और ए द्विवेदी
- आइसोफ़्लेवोन जेनिस्टीन इनहिबिट्स EGFR/P13K/Akt/NF-KB एक्टिवेशन ऐण्ड इन्ड्यूसेज एपॉप्टोसिस पाथवे इन ह्यूमन इण्डोमीट्रियल हाइपरप्लेज़ियल सेल्स, विनय शुक्ला, विशाल चन्द्रा, पी शंखवार, पी. पॉपली, विजय कुमार सिरोही, ए द्विवेदी

इण्टरनेशनल कॉन्फ्रॉन्स ऑन रिप्रोडक्टिव हेल्थ विद एम्फ़ैसिस ऑन ऑक्यूपेशनल, एनवायरनमेण्टल ऐण्ड लाइफ स्टाइल फैक्टर्स 26जी ऐन्युअल मीटिंग ऑफ़ द इण्डियन सोसाइटी फ़ॉर द स्टडी ऑफ़ रिप्रोडक्टिव ऐण्ड फ़र्टिलिटी (ISSRF) NIOH, ICMR अहमदाबाद (18-20 फरवरी, 2016)

- GRP30/Src काइनेज़-मीडिएटेड EGFR सिगनलिंग इज़ इनवॉल्व्ड

इन रेगुलेशन ऑफ़ साइक्लोऑक्ज़ी-जेनेस-2 एक्सप्रेशन इन रैट ओविडक्टल एपिथेलियल सेल्स, पूजा पॉपली, विजय कुमार सिरोही, विनय शुक्ला, ज्योति बाला कौशल, कंचन गुप्ता, अनिला द्विवेदी

- रोल ऑफ़ हेजहॉग/GLI1 सिगनलिंग इन इण्डोमीट्रियल हाइपरप्लेज़िया एण्ड इट्स रेगुलेटरी मेकैनिज़म, ज्योति वाला कौशल, सुपर्णा कुमारी, पूजा पॉपली पुष्प लता शंखवार, कंचन हजेला, अनिला द्विवेदी
- इन्टेग्रिन बीटा 8 इन्ड्यूज्ड FAK ऐक्टिवेशन रेगुलेट्स Vav एण्ड Rac 1 सिगनलिंग इन द एण्डोमीट्रियल एपिथेलियल सेल्स इन द प्रॉसेस ऑफ़ इण्डोमीट्रियल रिसेप्टिविटी फ़ॉर एम्ब्रयो इम्प्लांटेशन, विजय कुमार विनीत कुमार मौर्या, राजेश कुमार झा

बिट्ज़ कान्फ्रेन्स ऑन जीन ऐण्ड जीनोम रेगुलेशन, बिट्ज पिलानी, भारत (18-20 फरवरी)

- रोल ऑफ़ प्लाण्ट्स इन ट्रीटमेन्ट ऑफ़ डायबिटीज़ : एन अपडेट, आर परवीन, सविता मिश्रा, सतीश मिश्रा और एमके बसन्तानी

नेशनल मैगनेटिक रेज़ोनैन्सर सोसायटी ऑफ़ इण्डिया एन एम आर एस - 2016 का 22 वाँ सम्मेलन आई आई टी खड़गपुर (18-21 फरवरी)

- स्ट्रक्चर बेस्ड डिज़ाइन सिंथिसिज़ ऐण्ड सोल्यूशन कन्फ़र्मेशन स्टडी ऑफ़ $\alpha 38$ एण्ड $\alpha 4\beta$ साइक्लिक पेप्टाइड विद $\beta\gamma$ फ्यूज्ड टर्न स्ट्रक्चर, गजेन्द्र सिंह, पंचम सिंह कांडियाल, सुदीप पाल, तुषार कान्ति चक्रवर्ती और रवि शंकर अम्पापति
- एनएमआर सोल्यूशन कनफ़र्मेशन स्टडीज़ ऑफ़ नियोग्लाइको-पेप्टाइड्स क्लिक्ड पेन्टीनिलेटेड मैनोज़ ऐण्ड एन-ऐसिटाइलगैलेक्टोसैमाइन शुगर ऐमिनो ऐसिड, फ़याज़ आलम, पंचम सिंह कांडियाल, यशोदा कृष्ण, रवि शंकर अम्पापति, तुषार कान्ति चक्रवर्ती
- ए नॉवेल ऐप्रोच फॉर टेस्टिंग द टेराटोजेनिक पोटेन्शियल ऑफ़ केमिकल्स ऑन द प्लैटफॉर्म ऑफ़ मेटाबोलोमिक्स : एम्प्लॉइंग HR-MAS एनएमआर स्पेक्ट्रोस्कोपी, रोहित महर, एन सेठी, एन सिन्हा, संजीव के शुक्ला

आईएसएसआरएफ, 2016 अहमदाबाद (19-21 फरवरी)

- ऐलडोज़ रिडक्टेज़ रेगुलेट्स ब्लड टेस्टिस बैरियर, राजेन्दर सिंह, मुक्ता नन्द त्रिपाठी

पाँचवी इंडिगो रिसर्च कॉन्फ्रेन्स, लखनऊ (21-24 फरवरी)

- एक्सप्लॉएटिंग द डायज़ो ग्रुप प्रॉपर्टीज़ फौर डिवेलपिंग नॉवेल रिऐक्शन्स, नम्रता रस्तोगी

सीटीडीडीआर-करेण्ट ट्रेन्ड्स इन ड्रग डिस्कवरी रिसर्च, लखनऊ (25-28 फरवरी)

- ग्रीन प्रोटोकॉल्स फ़ॉर द वन पॉट सिंचिसिज़ ऑफ C-C एण्ड C-C/C-S बॉण्ड इन आयनिक लिक्विड, योगेश थोपटे, रिचा सिंह और अरूण के सिन्हा
- एनवॉयरनमेन्टली बेनाइन सिंथिसिज़ ऑफ़ सम ऐरिल सल्फ़ाइड ऐनालॉग्स विद इवैल्युएशन ऑफ़ देयर ऐण्टी बैक्टीरियल ऐक्टिविटी अगेन्स्ट स्टैफ़िलोकोकस ऑरियस, आदित्य जी लवेकर, साइमा, दानिश इकबाल, इशा सोनी, रितेश ठाकरे, अरूण के सिन्हा और सिद्धार्थ चोपड़ा
- सिंथिसिज़ एण्ड एण्टी मलेरियल ऐक्टिविटीज़ ऑफ़ चालकोन कूमरिन हाइब्रिड मॉलीक्यूल्स एण्ड अदर डेरीवटिव्स, एनएच अन्धारे, वाई थोपटे के श्रीवास्तव और ए के सिन्हा
- ऐरिलसल्फ़ाइड ऐनालॉग्स ऐज़ पोटेन्ट इनहिविटर्स ऑफ़ मेथिसिलिन ऐण्ड वैन्कोमाइसिन रेज़िस्टेन्ट *स्टैफ़िलोकोकस ऑरियस*, आई सोनी, ए जी लवकर, साइमा, पी करौलिया, आर ठाकरे, ए के सिन्हा और एस चोपड़ा
- पोटेन्शिएटेड डाइथायोकार्बामेट इनकॉर्पोरेटेड 5-नाइट्रो इमिडैज़ोल डेरीवटिन्स अगेन्स्ट रेज़िस्टेन्ट ट्रिकोमोनियासिसः डिज़ाइन, सिन्थिसिज़ ऐण्ड बायोलॉजी, धनराजु मंडलपु, भावना कुशवाहा, जे पी मैखुरी, गोपाल गुप्ता, वी एल शर्मा
- डिज़ाइन ऐण्ड सिन्थिसिज़ ऑफ़ नॉवेल ऐरिलपिपराज़ीन्स फ़ॉर बिनाइन प्रॉस्टैटिक हाइपरप्लैज़िया मैनेजमेन्ट, सोनल गुप्ता, दीप्ति पाण्डे, जे पी मैखुरी, गोपाल गुप्ता वी एल शर्मा
- Ca साल्टस ऑफ़ डाइथायोकार्बामेट ऐज़ नॉवेल स्पर्मिसाइडल एजेण्ट, माला सिंह, भावना कुशवाहा, जे पी मैखुरी, गोपाल गुप्ता, वी एल शर्मा
- रिज़वेराट्रॉल एनहैन्सेज थेराप्यूटिक एफिकेसी ऑफ़ सेलिकॉक्सिब इन कोलन कैन्सर सेल लाइन्स, सोनल श्रीवास्तव, जयन्त देवंगन, दिव्या टण्डन ऐण्ड श्रीकान्ता कुमार रथ
- एसोसिएशन बिटवीन miR-499 पॉलीमॉर्फिज़्म ऐण्ड सस्केटिटविलिटी टु ओरल स्क्वेमस सेल कार्सिनोमा, दिव्या मोहन, जयन्त देवंगन, सोनल श्रीवास्तव, श्रीकान्ता कुमार
- इवैल्युएशन ऑफ़ सिस्टैलिन सी ऐज़ पोटेन्शियल बायोमार्कर फ़ॉर क्रोनिक किडनी डिज़ीजे, कविता दुर्गापाल विवेक भोसले, सत्येन्द्र सोनकर शैल सिंह, मुकेश श्रीवास्तव, एम पी एस नेगी, असीम घटक
- ऐण्टी इन्फ्लमेटरी पोटेन्शियल ऑफ़ कोऐगुलिन-एल इन एल पी एस इन्ड्यूज्ड इनडोटॉक्सीमिया, एस एस रेड्डी, प्रीति मौर्या, पारूल चौहान, दीपिका सैनी, प्रेम पी यादव, एम के बर्थवाल
- इफ़ेक्ट ऑफ़ हाइ फ़ैट डाइट ऑन बोन मैरो डेराइण्ड मैक्रोफ़ेज पोलराइज़ैशन, अनन्त जैसवाल, सुक्का संतोष रेड्डी, प्रीति मौर्या और एम के बर्थवाल
- इन्डक्शन ऑफ़ टोल लाइक रिसेप्टर पाथवे, ऑटोफ़ैजी ऐण्ड इन्डोथिलाइल डिस्फंक्शन ड्यूरिंग डायट इन्ड्यूज्ड ओबेसिटी, प्रीति मौर्या, संतोष रेड्डी, अनन्त जैसवाल, मनोज कुमार वर्थवाल
- कम्पैरेटिव स्टडी ऑफ़ ऐपॉसिनिन ऐण्ड डायापॉसिनिन इफ़ेक्ट ऑन फ़ोम सेल इनफ़ॉर्मेशन इन टीएचपी-1 मैक्रोफ़ेज ए कुमार, एम राना, पी गुप्ता, एच चन्दासना वाई एस छोंकर, आर एस भट्टा और एम के बर्थवाल
- फ़ोटोजेडुनिन, ए कम्पाउंड फ्रॉम *जाइलोकार्पस ग्रान्टम* इनहिबिट्स ऐडीपेनेनेसिस बाई अरेस्टिंग मिटोटिक क्लोनल एक्सपैंशन, अभिषेक गुप्ता, कृपा शंकर, सलिल वार्ष्णेय, सुजीत राजन, अंकिता श्रीवास्तव, दुर्गेश कुमार, टीनरेन्दर और अनिल एन गायकवाड़
- डिज़ाइन ऐण्ड डिवेलपमेन्ट ऑफ़ पाइरैनॉन डिराइण्ड नॉवेल फ़्लोरेसेन्ट प्रोब्स फॉर केमोसेन्सिंग ऐण्ड बायोइमेंजिंग ऐप्लीकेशन्स, शहिदा उमर, अजय कुमार झा, आशुतोष शर्मा और अतुल गोयल
- डिज़ाइन एण्ड सिंथिसिज़ ऑफ़ न्यू फ़ंक्शनलाइज़्ड बाइफ़ेनिल्स ऐण्ड पाइरैनन्स ऐज़ पोटेण्ट ऐण्टी हाइपर ग्लाइसेमिक एजेण्ट्स शची मिश्रा, पल्लवी अवस्थी, ए के श्रीवास्तव, ए गायकवाड़, एस के रथ और अतुल गोयल

- सिथिसिज़ इनैन्शियोमेरिक रेज़ोल्यूशन ऐण्ड वोन ऐनावोलिक ऐक्टिविटी ऑफ़ मेडीकार्पिन ऐण्ड 9-डिमेथॉक्सी मेडीकार्पिन चन्द्र प्रकाश गुप्ता, दीपक पुरोहित आशुतोष रघुवंशी, दिव्या सिंह और अतुल गोयल
- ऐण्टीमलेरियल ऐक्टिविटी ऑफ न्यूली सिन्थिसाइज़्ड इन्डोल डेरीवटिप्स अगेन्स्ट क्लोरोक्विन रेज़िस्टेन्ट एण्ड सेन्सिटिव स्ट्रेन्स ऑफ प्लाज़मोडियम फ़ैल्सीपैरम, भावना सिंह चौहान, एन देवेन्दर, आर पी त्रिपाठी और रेनू त्रिपाठी
- आर्टीयर-विटामिन डी को ट्रीटमेन्ट ऐटिन्यूएट्स एक्सपेरीमेन्टल सेरेब्रल मलेरिया, हेमलता द्विवेदी, सुनील कुमार सिंह और रेनू त्रिपाठी
- एक्सप्लोरेशन ऑफ़ मेकैनिज़म इन्वॉल्व्ड इन सिनरजिस्टिक इन्टरैक्शन ऑफ़ मैफ़्लोक्विन एण्ड क्लैरिथ्रोमाइसिन, सारिका गुंजन, हफ़्ज़ा अहमद, अनिल कुमार द्विवेदी और रेनू त्रिपाठी
- इफ़ेक्ट ऑफ़ आर्टीथर ऑन हिस्टैमिन रिसेप्टर्स विद लेट स्टेज सेरेब्रल मलेरिया, सुनील कुमार सिंह, हेमलता द्विवेदी और रेनू त्रिपाठी
- डायनमिक्स ऑफ़ होस्ट ऐण्टीजन - प्रेजेन्टिग सेल्स ड्यूरिंग अर्ली स्टेजेज़ ऑफ़ *ब्रूजिया मलाइ* इनइफेक्टिव लार्वा स्टेज 3 (Bm-L3) इनफ़ेक्शन अदिति शर्मा, पंकज शर्मा और मृगांक श्रीवास्तव
- रोल ऑफ़ ड्यूरिंग फ़ाइलेरियल मैनिफ़ेस्टेशन ऑफ़ ट्रॉपिकल पल्मोनरी इयोसिनोफिलिया पंकज शर्मा, आदिति शर्मा और मृगांक श्रीवास्तव
- *प्लाज़मोडियम* स्टीरॉइल-CoA Δ9 डिसैच्युरेज़ इज़ इम्पॉर्टेन्ट फ़ॉर द लेट लिवर स्टेज डिवेलपमेन्ट आर इनीसिएशन ऑफ़ ब्लड सटेजेज़, एस के नरवाल, एच एच चौधरी, आर गुप्त, ए घोष, के ए कोटा और एस मिश्रा
- ऐसपोरोज़ॉइट ट्रान्समेम्ब्रेन प्रोटीन PbS14 प्रोड्यूज़्ड बाई असिस्ट स्पॉरोज़ॉइट्स फ़ैसिलिटेट्स कमिटमेन्ट ऑफ़ स्पॉरोज़ॉइट्स टु इनवेड ऐनोफ़िलीज़ स्टेफ़ेन्सी सलाइवरी ग्लैण्ड्स, ए घोष, एस के नरवाल, आर गुप्ता, एच एच चौधरी, एस के कोली, के ए कोटा और एस मिश्रा
- प्लाज़मोडियम Sufs मीडिएट्स मल्टीपल बायोलॉजिकल रोल्स ड्यूरिंग पैरासाइट डिवेलपमेन्ट इन एनोफ़िलीज़ स्टीफ़ेनसी ऐण्ड मैमैलियन होस्ट, एस एच चौधरी, एम चरन, आर गुप्ता, के ए कोटा, एस हबीब और एस मिश्रा
- *इन विट्रो* सस्केप्टिबिलिटी ऑफ़ इण्डियन फील्ड आइसोलेट्स ऑफ़ *प्लाज़मोडियम फ़ैल्सीपैरम* टु स्टैण्डर्ड ऐण्टीमलेरियल्स एण्ड एण्टी बायोटिक्स, पूजा अग्रवाल और कुमकुम श्रीवास्तव
- सिन्थिसिज़ ऐण्ड ऐण्टीमलेरियल ऐक्टिविटीज़ ऑफ़ चालकोन-कूमरिन हाइब्रिड मॉलीक्यूल्स ऐण्ड अदर डेटीवटिव्स, नितिन एच अंधारे, योगेश थोप्टे, कुमकुम श्रीवास्तव और अरूण के सिन्हा
- ऐसेसिंग ऑर्गैनील स्पेसिफ़िक फ़ोल्डिंग और मेटास्टैबल सेन्सर ऐण्ड पर्टविंग देयर फोल्डिंग कैपेसिटी थ्रू स्मॉल मॉलीक्यूल्स, आर शर्मा, एम परमानिक, एन रस्तोगी और एन कुमार
- वॉलबैशिया ट्रान्सक्रिप्शन एलनगेशन फ़ैक्टर(WolGreA) यूबिक्विटसली प्रेज़ेण्ट इन बी. मलाइ लाइफ़स्टेजेज़ : सी टर्मिनल डोमेन इम्पार्ट्स चेपरॉन लाइक ऐक्टिविटी वाइल N-टर्मिनल डोमेन इण्टरैक्ट्स विद DNA, धनवन्तरि चहार जितेन्द्र कुमार नाग, अंशुल चावला, अरिन्दम भट्टाचारजी, तनुज शर्मा, कल्याण मिश्रा, मो. इमरान सिद्दीकी, शैलजा मिश्रा भट्टाचार्या
- इम्यून रिस्पॉन्स ऑफ़ बैंक्राफ्टियन पेशेण्ट्स टु ब्रूनिया मलाइ ट्रेहलोज़-6 फ़ॉस्फ़ेट फ़ॉस्फ़ेट ऐण्ड हेवी चेन मायोसिन, रूचि झा, ममता गंगवार, धन्वन्तरि चहार, शेट्टी बालकृष्ण आनन्द और शैलजा मिश्रा भट्टाचार्य
- ट्रेहलोज़-6 फ़ॉस्फ़ेट-फ़ॉस्फ़ेट ऑफ़ ब्रूजिया मलाई शोज़ प्रॉमिस ऐज़ ऐण्टी फ़ाइलेरियल वैक्सीन कैण्डीडेट सुशीला कुशवाहा, प्रशान्त कुमार सिंह, निधि श्रीवास्तव, ममता गंगवार, प्रभात रंजन मिश्रा और शैलजा मिश्रा भट्टाचार्य
- फार्माकोकायनेटिक ड्रग इण्टरैक्शन पोटेन्शियल ऑफ़ डिहाइड्रोआर्टिमिज़िनिन-डिसब्यूटिल ल्युमिफ़ैन्ट्रिन कॉम्बीनेशन, मो. यासिन मलिक, बलवीर राम, के एस आर राजू, इशा तनेजा ममुनुर राशिद और वहाजुद्दीन
- डोज़ डिपेन्डेन्ट प्री-क्लीनिकल फ़ार्माकोकाइनेटिक स्टडीज़ ऑफ़ सीडीआरआई मॉलीक्यूल S007-1500, ममुनुर राशिद, इशा तनेजा, के एस आर राजू, संदीप के सिंह और वहाजुद्दीन
- LC-ESI-MS/MS मेथड डिवेलपमेन्ट फ़ोर बायो एनालिटिकल डिटर्मिनेशन ऑफ + S007-1500 एण्ड इट्स ऐप्लिकेशन टु इन विट्रो फ़ार्माकोकायनेटिक स्टडीज़, कृपाल, भलाला, इशा तनेजा, के एस आर राजू, सन्दीप के सिंह, ममनुर राशिद और वहाजुद्दीन
- *इन विट्रो* ऐण्ड इन वीवो फ़ार्माकोकाइनेटिक ऐसेसमेन्ट ऑफ़ नॉवेल ऐण्टी ओस्टियोपोरोसिस सीडीआरआई मॉलीक्यूल S011.1793 संदीप के सिंह, इशा तनेजा, के एस आर राजू, ममनुर राशिद और बहाजुद्दीन
- इन्वेस्टिगेशन ऑफ़ फ़ार्माकोकाइनेटिक हर्ब ड्रग इण्टरैक्शन्स स्वाति चतुर्वेदी, इशा तनेजा, के एस आर राजू ममनुर राशिद और वहाजुद्दीन
- इफ़ेक्ट और पैंक्रियास्टैटिन ऑन इन्स्युलिन रेज़िस्टेन्स ऐण्ड ग्लुको होम्योस्टैटिस इन विट्रो, आनन्द पी गुप्ता, गुरू आर वैलिचेरला, ज़ाकिर हुसैन, अनीस ए सैयद और जियाउर आर गाइन
- एक्सट्रैक्ट ऐण्ड फ्रैक्शन फ्रॉम *अल्मस वॉल्चायना* ऐटिन्युएट्स DOCA-सॉल्ट इन्ड्यूज़्ड एण्ड स्पॉन्टेनियसली हाइपरटेन्सिव रैट्स, अनीस ए सैयद, शिवानी लहरी दिव्या मोहन, सुधीर कुमार, काशिफ़ हनीफ़, जियाउर आर गाइन
- इन विट्रो प्री-क्लीनिकल फ़ार्माकोकाइनेटिक स्टडीज़ ऑफ़ नॉवेल एण्टी ट्यूमर सीडीआरआई कैण्डीडेट मॉलीक्यूल्स S009-131 एण्ड S011-1992 मो. रियाजुद्दीन, मीनाक्षी शुक्ला, रवितेज सिंह, जयन्त सरकार, के वी शशिधरा और जियाउर आर गाइन
- LC-MS/MS यूज़िंग इलेक्ट्रोस्प्रे आयोनाइज़ेशन फ़ॉर वायोएनालिटिकल मेथड वैलिडेशन ऑफ S009-0629 इन रैट प्लाज़्मा एण्ड इट्स ऐप्लिकेशन टु प्रीक्लीनिकल फ़ार्माकोकाइनेटिक स्टडी, गुरू आर वेलिचेरला, किशन एस इटैलिया, संदीप के सिंह, सुधीर शाही, आनन्द पी गुप्ता अतुल गोमल, जियाउर आर गाइन
- प्री-क्लीनिकल फ़ार्माकोकायनेटिक्स ऐण्ड टिश्यू डिस्ट्रीब्यूशन एटडी ऑफ + S007-1588, ए नॉवेल माइकोबैक्टीरियल एटीपी सिन्थेज़ इनहिबिटर, एस जैसवाल, के रवीन्द्रचारी, ए शर्मा, एस सिंह, ए के सक्सेना, जे लाल
- *इन विट्रो* और *इन वीवो* फ़ार्माकोकायनेटिक्स ऑफ़ 012-1965 ए पोटेण्ट ऐण्टी डायबिटिक कुपाउंड, एम शुक्ला, एम वाई मलिक, एस जैसवाल, के के जी रामकृष्ण, आर पी त्रिपाठी, जे लाल

- LC-MS/MS मेथड एण्ड इट्स ऐप्लिकेशन टु प्री-क्लीनिकल फ़ार्माकोकाइनेटिक स्टडी ऑफ़ S013-0226, ए नॉवेल ऐण्टी विनाइन प्रॉस्टैटिक हाइपरप्लेज़िया (BPH कंपाउंड) आर गोयानी, डी के टैनपुला, एम शुक्ला, एस जैसवाल, एस गुप्ता, वी एल शर्मा, जे लाल
- HMGB1 स्युमॉयलेशन म्युटेशन आलटर्स TLR4 इंटरैक्शन ड्यूरिग साइटोकाइन्स मीडिएटेड सिग्नलिंग, दीपिका गोयल, हिमालय सिंह, कुमार बेलु जगवेलु
- MAPKAPK2 रेगुलेट्स द लिपोपॉलीसैक्राइड मीडिएटेड एण्डोथेलायल माइक्रोपार्टिकल जेनरेशन, दीप्ति त्रिपाठी, भारती बिस्वास, अमित कुमार वेलु जगवेलु
- माइटोकॉन्ड्रिया, ए न्यू प्लेयर इन एण्डोथेलायल माइक्रोपार्टिकल्स भारती विस्वास, दीपिका गोयल, दीप्ति त्रिपाठी, कुमार वेलु जगवेलु
- GSK-3β रेगुलेट न्यूरॉनल माइग्रेशन इन टु स्ट्रायटम एण्ड NSC फ़ेट चॉइस वाया Wnt/β-कैटनिन सिगनलिंन इन द SVZ ऑफ़ पार्किन्सोनियन रैट्स सोनू सिंह, आकांक्षा मिश्रा, शुभा शुक्ला
- ए नॉवेल सीडीआरआई कंपाउंड पजेसेज़ पोटेन्ट ऐण्टी-ऐन्जियोजेनिक इफ़ेक्ट, प्रीति शर्मा, हिमालय सिंह, कुमार वेलु जगवेलु
- ऐसिटिल-L कार्निटिन एनहैन्सेज़ न्यूरॉनल सर्वाइवल ऐण्ड इम्प्रूव्स कॉग्निटिव फ़ंक्शन्स वाया अपरेगुलेशन ऑफ़ डोपामाइन D1 रिसेप्टर ऐण्ड ग्लुटामेट ट्रान्सपोर्टर-1 इन द हिपोकैम्पस ऑफ़ पार्किन्सन्स डिज़ीज़, आकांक्षा मिश्रा, सोनू सिंह, शुभा शुक्ला
- LCAR प्रोटेक्ट डोपामिनर्जिक न्यूरॉन्स ऐण्ड एक्ज़र्ट्स प्रो न्यूरोजेनिक इफ़ेक्ट बाई इनहिबिशन ऑफ़ ग्लायल ऐक्टिवेशन ऑन ऐण्ड ऑक्सीडेटिव स्ट्रेस इन पार्किन्सन डिज़ीज़, नेहा श्रीवास्तव, सोनू सिंह, आकांक्षा मिश्रा, शुभा शुक्ला
- इनड्यूसिबिल नाइट्रिक ऑक्साइड सिथेज़ पोटेन्शिएट्स इमैटिनिब इन्ड्यूज़्ड सेल साइकल अरेस्ट एण्ड एपॉप्टोसिस इन ल्यूकीमिक सेल लाइन दीपिका अवस्थी, अभिषेक कुमार सिंह, मेधा दुबे, शीला नागरकोटि, मनोज कुमार बर्थवाल और मधु दीक्षित
- न्यूट्रोफ़िल्स एफ़िशिएन्टली किल माइक्रोब्स बाई फ़ैगोसाइ-टोसिस थ्रू ऑगमेन्टिंग ROS एण्ड NO जेनरेशन, शीला-नागरकोटि, अभिषेक कुमार सिंह, मेधा दुबे, दीपिका अवस्थी समरीन सदफ़ कुमार वेलु जगवेलु एण्ड मधु दीक्षित
- CDR-267-F018 ऐमेलिओरेट्स हाइपर लिपिडेमिया ऐण्ड एसोसिएटेड डेलिटेरिअस इफ़ेक्ट्स ऑन द लिवर ऑफ़ APOE KO माइस, जे एस कांशना, एस सी रिबेलो पी पाठक, के नागेश्वरराव, एम एन श्रीवास्तव, टी नरेन्दर, ए के द्विवेदी, कुमार वेलु जे, एम के बर्थवाल एण्ड एम दीक्षित
- मेटाबोलिक स्टेटस ऑफ़ इनड्यूसिबल नाइट्रिक ऑक्साइड सिन्थेज़ नॉक आउट माइस फ़ेड ऑन वेरिअस कैलोरी डायट्स, नागेश्वर राव कनूरी, जितेन्द्र एस कांशना, प्रिया पाठक, संजय सी रिबेलो, आनन्द पी गुप्ता, जियाउर आर गाइन, कुमारवेलु जे, मनोज के बर्थवाल और मधु दीक्षित
- इन्फ़्लुएन्स ऑफ़ इन्स्युलिन रेज़िस्टेन्स ऑन ऐसिटिलकोलीन इन्ड्यूज्ड वैसोरिलैक्सेशन फॉलोइंग हाई फैट डायट फीडिंग इन इन्ड्यूसिबल नाइट्रिक ऑक्साइड सिन्थेज़ नॉकआउट ऐण्ड वाइल्ड टाइप माइस, प्रिया पाठक, जितेन्द्र एस कांशना संजय सी रिबेलो, नागेश्वरराव कनूरी, एम के बर्थवाल, जे कुमार वेलु और मधु दीक्षित
- कम्पैरेटिव प्रोफाइलिंग ऑफ़ फ़ेनोलिक कंपाउंड्स फ्रॉम डिफ़रेन्ट प्लाण्ट पार्ट्स ऑफ़ सिक्स टर्मिनैलिया स्पेशीज़ बाइ लिक्विड क्रोमैटोग्राफी विद टैनडम मास स्पेक्ट्रोमीट्री विद केमोमीट्रिक एनालिसिस अवन्तिका सिंह, विकास बाजपेयी, सुनील कुमार, ब्रजेश कुमार, के बी रमेश कुमार
- रैपिड क्वान्टिटेटिव एनालिसिज़ ऑफ मल्टीकॉम्पोनेन्ट्स इन ऐण्डोग्रैफिज़ पैनिकुलेटा यूजिंग अल्ट्रा हाइ परफ़ॉर्मेन्स लिक्विड क्रोमैटोग्राफ़ी कपल्ड विद ट्रिपल क्वाड्रुयोल मास स्पेक्ट्रोमीट्री : ऐप्लिकेशन टु सॉइल सॉडिसिटी ऐण्ड ऑर्गेनिक फार्मिंग प्रीति चन्द्रा, रेनू पाण्डे, ब्रजेश कुमार
- आइडेन्टीफ़िकेशन, कैरेक्टराइज़ेशन एण्ड डिस्ट्रीब्यूशन ऑफ़ मोनोटर्पीन इन्डोल अल्कलॉइड्स इन राउवोल्फ़िया स्पिशीज़ बाई आर्बिट्रेप बेलॉस प्रो मास स्पेट्रोमीटर, सुनील कुमार, अवन्तिका सिंह, विकास बाजपेई, ब्रजेश कुमार
- क्वालिटी असेसमेन्ट ऑफ़ गार्सिनिया स्पिशीज़ वेस्डऑन द साइमलटेनियस डिटर्मिनेशन ऑफ मल्टीक्लास ऑफ़ बायोऐक्टिव कॉन्एटीट्युएन्ट वाई UHPLCQqQLIT-MS/MS रेनू पाण्डे, प्रीति चंद्रा, ब्रजेश कुमार
- UPLC-QqQLIT-MS/MS बेस्ड रैपिड, सेन्सिटिव ऐण्ड वैलिडेटेड मेथड फ़ॉर साइमलटेनियस आइडेन्टीफ़िकेशन ऐण्ड क्वान्टिटेशन ऑफ़ सिक्स पोटेन्शियल ओस्टियोजेनिक एजेण्ट्स इन डिफ़रेन्ट पार्ट्स ऑफ़ ब्यूटी मोनोस्पर्मा (सिन ब्यूटी फ्रॉन डोसा), विकास बाजपेई, अवन्तिका सिंह, खुशबू शर्मा, महेन्द्र सहाय, राकेश मौर्या, बृजेश कुमार
- एनएमआर बेस्ड मेटाबोलोमिक एप्रोच टु एक्सप्लेन द टिश्यू स्पेसिफ़िसिटी ऐण्ड सीज़नल वैरिएशन ऑफ द अल्कालाइड्स इन ऐल्सटोनिया स्कॉलैरिस रोहित महर, डी के मिश्रा, संजीव के शुक्ला
- अल्ट्रास्ट्रक्चरल एण्ड फिज़ियोलॉजिकल इफ़ेक्ट्स ऑफ ऐन ओरली ऐक्टिव क्लेरोडेन डिटर पीन इन लीशमैनिया डोनोवनी, भानु प्रिया अवस्थी, मनोज कथूरिया, अरिन्दम भट्टाचारजी, कोनेनी वी शशिधरा, सूर्य प्रताप सिंह, कल्याण मित्रा
- एवसप्रेशन ऑफ़ जर्म सेल मैच्योरेशन मार्कर्स इन HPV पॉज़िटिव सर्विकल कैन्सर्स कैन बी थेराप्यूटिक टार्गेट्स, ए जैन, एस के अग्निहोत्री, ए के अग्रवाल, बी ए हाकिम, एम एल बी भट्ट, आर सचान, एम सचदेव
- इफ़ेक्ट ऑफ चैब्यूलिनिक ऐसिड ऑन मेल रिप्रोडक्टिव सिस्टम ए के अग्रवाल, एस सी तिवारी, आर सचान, टी नरेन्दर और एम सचदेव
- इम्प्लिकेशन ऑफ़ ऊसाइट मैच्योरेशन मार्कर्स ड्यूरिंग ओवेरियन फेल्योर इन माउस मॉडल, बी ए हाकिम, ए नाथ, एस के अग्निहोत्री, ए के अग्रवाल, ए जैन, डी सिंह, एस मौर्या, आर कोनवर और एम सचदेव
- रिडनडेन्सी ऑफ़ साइटोसोलिक काइनेज़ेज़ ऑफ़ माइकोबैक्टीरिया इस रिलायंट ऑन सेलेक्टिव फ़ॉस्फ़ोरि-लेशन्स ऑफ़ सम कॉमन सब्सट्रेट्स, समीर तिवारी, शिवराज यबाजी, रिचा सक्सेना, के प्रमोद
- प्रोटीन टाइरोसिन काइनेज़ A फ़ॉस्फ़ोरिलेट्स PtpA एण्ड ऑगमेन्ट्स इट्स सीक्रेशन, विच फर्दर लीड्स टु एन हैन्स्ड इन्ट्रासेल्युलर सर्वाइवल ऑफ़ माइकोबैक्टीरिया, स्वाति जैसवाल, अदिति चैटर्जी, सपना पाण्डे और किशोर के श्रीवास्तव

- इम्यूनोप्रोटेक्टिव इफ़ेक्ट्स ऑफ़ मेथॉज़ाइआइसोफ्लेवॉन्स फ़ॉरमोनोनेटिन ऐण्ड आइसोफ़ार्मोनोनेटिन प्रोमोट ओस्टियो-जेनेसिस इन एस्ट्रोजन डेफ़िशिएन्ट बोन लॉस कन्डीशन्स, मो. निज़ाम मन्सूरी, अब्दुल मलिक त्यागी, प्रियंका शुक्ला कामिनी श्रीवास्तव, कपिल देव, राजू चिल्लारा, राकेश मौर्या दिव्या सिंह
- ए नॉवेल सिंथेटिक टेरोकार्पेन SO15-972 प्रोमोट्स ओस्टिपोब्लास्ट डिफ़रेन्सिएशन ऐण्ड प्रिवेन्ट्स एस्ट्रोजन डेफिशिएन्सी इन्ड्यूज्ड बोन लॉस, प्रियंका शुक्ला, आशुतोष रघुवंशी, मो. निज़ाम मंसूरी अतुल गोयल, दिव्या सिंह
- ए कॉम्बिनेशन ऑफ़ आइसोफ़्लेवोनॉइड्स (MIF) आइसोलेटेड फ्रॉम ब्यूटी मोनोस्पर्मा एक्सट्रैक्ट इज़ मोर इफ़ेक्टिव वैन द स्टैन्डर्डाइज़्ड फ्रैक्शन इन प्रमोटिंग न्यू बोन फॉर्मेशन ऐण्ड पॉजिटिवली इफ़ेक्ट्स वेरिअस बोन पैरामीटर्स इन ग्रोइंग स्प्रॉग डाले रैट्स कृष्ण भान सिंह, अबनीश के गौतम, राकेश मौर्या, अतुल गोयल, दिव्या सिंह

इमर्जिंग ट्रेण्ड्स इन बायोलॉजिकल साइन्सेज़ ऐट अलीगढ़ (6-8 मार्च)

- ए स्टडी ऑन द रोल ऑफ़ फ़ैटी ऐसिड सिन्चेज़ इन राइट वेन्ट्रिकल हाइपरट्रॉफ़ी एसोसिएटेड विद पल्मोनरी हाइपरटेन्शन। इमर्जिंग ट्रेण्ड्स इन बायोलॉजिकल साइन्सेज़, एन सिंह, आई जहान, के हनीफ़

अमेरिकन केमिकल सोसायटी सैन डियागो, कैलिफ़ोर्निया यू.एस. द्वारा आयोजित "कम्प्यूटर्स इन कैलिफ़ोर्निया पर 251 वीं एसीएस नैशनल मीटिंग (13-17 मार्च)

- डिजाइन ऐण्ड सिंथिसिज़ ऑफ़ नॉवेल कूमारिन ऐनॉलॉग्स बाई मैनिच टाइप रिऐक्शन फ़ॉर स्पर्मिसाइडल एण्ड एण्टी माइक्रोबियल ऐक्शन्स; ए डुए ल ऐप्रोच फ़ॉर कॉन्ट्रासेप्शन, स्वाति गुप्ता, भावना कुशवाहा, गोपाल गुप्ता अनिल कुमार द्विवेदी

इण्टरनैशनल सोसाइटी ऑन ऑप्टिक्स विद इन लाइफ़ साइंसेज़ (OWLS 2016), मुम्बई (16-19 मार्च)

- डोनर ऐक्सेप्टर बेस्ड पाइरैनन डिराइण्ड फ्लोरेसेन्ट डाइज़ फ़ॉर OLEDS, बायोइमेजिंग ऐण्ड केमोसेन्सिंग ऐप्लिकेशन्स, अजय कुमार झा, आशुतोष शर्मा, शाहिदा उमर, मोनिका सचदेव, आमिर नाज़िर, कल्याण मित्रा, आर एस आनन्द और अतुल गोयल

करेण्ट ट्रेण्ड्स इन मेडिसिनल केमिस्ट्री एण्ड फार्मास्युटिकल साइंसेज इन ड्रग डिस्कवरी, पर 8वीं नाइपर सीएसआईआर-सीडीआरआई संगोष्ठी, नाइपर-रायबरेली (18-19 मार्च)

- कूमरिन चालकोन हाइब्रिड, S011-1992 ए नॉवेल ऐण्टी कैन्सर CDRI ड्रग कैन्डीडेट : डिवेलपमेन्ट एण्ड प्री क्लीनिकल असेस्मेन्ट, मीनाक्षी शुक्ला, मो. रियाजुद्दीन, रवितेज सिंह, जयन्त सरकार, के वी शशिधरा और जियाउर आर गाइन
- ए रिर्क्स फेज हाईपरफार्मेन्स लिक्विड क्रोमैटोग्राफ़ी मेथड डिवेलपमेन्ट ऐण्ड वैलिडेशन फ़ॉर द क्वान्टिफिकेशन ऑफ़ नॉवेल ऐण्टी कैन्सर चालकोन कार्ड मोनिन इन रैट प्लाज़्मा ऐण्ड ऐप्लिकेशन टु प्लाज़्मा प्रोटीन बाइन्डिंग स्टडी आर गोयानी, डी के टेनपुला, एस जैसवाल, एम शुक्ला, जे लाल
- प्रीक्लिनिकल फ़ार्माकोकाइनेटिक स्टडी ऑफ़ S013-1632 ए नॉवेल ऐण्टी बिनाइल प्रोस्टैटिक हाइपर-प्लेज़िया (BPH) कम्पाउंड यूजिंग LC-MS/MS, डीके टैनपुला आर गोयानी, एम शुक्ला, एस जैसवाल, एस गुप्ता, वी एल शर्मा जे लाल
- नॉवेल एन अलकाइल कैलिमाइड डेरीवटिव्स ऐज़ स्पर्मिसाइडल एजेण्ट्स : डिज़ाइन ऐण्ड सिन्थिसिज़, आशीष कुमार ठाकुर, धनराजु मण्डलपु, भावना कुशवाहा, जे पी मैखुरी, गोपाल गुप्ता वी एल शर्मा

ऐडवान्सेज़ इन कैन्सर थेराप्यूटिक्स-2016 पर नैशनल कान्फ्रेन्स (ACT-2016), सीएसआईआर-आईसीटी, हैदराबाद (4-5 अप्रैल)

- बीटा पेप्टाइड ऐज़ इनहिबिटर्स फ़ॉर द स्टैट प्रोटीन एनटीडी, पंचम सिंह, रवि शंकर अम्पापति

इम्यूनोलॉजी 2016 AAI मीटिंग सिऐटल, वशिंगटन, यूएसए (13-17 मई)

- iNOS ओवर एक्सप्रेशन रिड्यूसेज़ K562 सेल प्रॉलीफ़रेशन ऐण्ड प्रमोट्स न्यूट्रोफ़िलिक डिफ़रेन्सिएशन, दीपिका अवस्थी, अभिषेक कुमार सिंह, मेधा दुबे, शीला नागरकोटि, मनोज कुमार बर्थवाल और मधु दीक्षित

मटीरियल्स एंजीनियरिंग और नैनोटेक्नोलॉजी, ताइपे, ताइवान में अन्तराष्ट्रीय सम्मेलन (20-22 मई)

- डोनर ऐक्सेप्टर पाइरैनन-डेराइण्ड फ़्लोरेसेन्ट कंपाउंड्स फ़ॉर ऑर्गैनिक इलेक्ट्रॉनिक डिवाइसेज़ एण्ड सेल इमेजिंग, अतुल गोयल

इलेक्ट्रॉन माइक्रोस्कोपी पर अन्तरराष्ट्रीय सम्मेलन वाराणसी (02-04 जून)

- ऑरमेलॉक्ज़ीफ़ीन, ए सेलेक्टिव एस्ट्रोजेन रिसेप्टर मॉड्युलेटर, इनड्यूसेज़ ऑटोफ़ैजी एसोसिएटेड एपॉप्टॉसिस थ्रू ऐक्टिवेशन ऑफ़ ER स्ट्रेस इन ओवेरियन कैंसर *इन विट्रो,* अरिदम भट्टाचार जी, मो. हसनैन, मनोज कथूरिया, जयन्त सरकार, कलयाण मित्रा
- अल्ट्रास्ट्रक्चरल ऐण्ड फ़िजियोलॉजिकल स्टडीज़ ऑन द ऐण्टी-प्रॉलिफ़रेटिव इफ़ेक्ट्स ऑफ़ प्लमबैगिन इन *लीशमैनिया डोनोवनी,* मनोज कथूरिया, भानु प्रिया अवस्थी और कल्याण मित्रा
- अल्ट्रास्ट्रक्चरल एण्ड फ़िजियोलॉजिकल इफ़ेक्ट्स ऑफ़ HSP90 इन-हिबिटर जेडनिन इन ओवेरियन कैंसर सेल्स रोहित सहाय, अरिन्दम भट्टाचार जी, पी सुकन्या, सब्बू सतीश टी नरेन्दर, कल्याण मित्रा

योरप में पॉपुलेशन ऐप्रोच ग्रुप की 25वीं वार्षिक बैठक (PAGE 2016) लिस्बन विश्वविद्यालय, पुर्तगाल (07-10 जून)

- फ़ार्माकोकाइनेटिक-फ़ार्माकोडाइनेमिक मॉडलिंग ऑफ़ मिल्टफ़ोज़िन इन *लीशमैनिया डोनोवनी* इनफ़ेक्टेड गोल्डेन सीरियन हैमस्टर्स, एस जैसवाल, टी पी सी डारेलो, एम शुक्ला ए शर्मा, बी तिवारी, एन गोयल, जे लाल

11वीं अन्तर्राष्ट्रीय ISSX मीटिंग, बुसान (12-16 जून)

- असेसमेन्ट ऑफ़ डोज़ ऐण्ड टाइम डिपेन्डेन्ट इफ़ेक्ट्स ऑफ़ 16-डिहाइड्रोप्रेगनेनोलीन ऑन रैट हैपैटिक फ़ेज़1 ड्रग मेटाबोलाइजिंग एन्ज़ाइम्स रचुमल्लू रामकृष्ण, मनीषा भटेरिया, राजबीर सिंह, रबी शंकर भट्टा

केमिस्ट्री में 19वीं CRSI नैशनल सिम्पोज़ियम नार्थ बंगाल विश्वविद्यालय, सिलीगुड़ी (14-16 जुलाई)

- डोनर-ऐक्सेप्टर फ़्लोरेसेन्ट कंपाउंड्स फ़ॉर ऑर्गैनिक इलेक्ट्रॉनिक ऐण्ड सेल इमेजिंग ऐप्लिकेशन्स, अतुल गोयल

जापानी न्यूरोसाइन्स सोसाइटी की 39वीं वार्षिक बैठक चोकोहामा जापान (20-22 जुलाई)

- फ़ाइटोजोम्स ऑफ़ NMITLI 118 RT+ : ए प्रूडेन्ट थेराप्यूटिक ऐप्रोच फ़ॉर फ़ेवरेवल आउटकम्स इन ईशमिक इंजरी हफ़जा अहमद, अभिषेक आर्या सतीश अग्रवाल, राकेश शुक्ला, अनिल कुमार द्विवेदी

अल्ज़ाइमर्स एसोसिएशन का अंतरराष्ट्रीय सम्मेलन (AAIC), 2016, टोरन्टो, कनाडा (24-28 जुलाई)

- क्रोनिक डिज़ोसिलपाइन (MK801) पोटन्शिएट्स मेमोरी : ए पैराडॉक्सिकल मेकैनिज़्म, चन्दन सोना, आलोक त्रिपाठी, प्रेम नारायण यादव

SSX इण्डियन सोसायटी फ़ॉर द स्टडी ऑफ़ ज़ेनोबायोटिक्स का प्रथम सम्मेलन, बैंगलौर (01-03 सितम्बर)

- इन्वेस्टीगेशन ऑफ़ इफ़ेक्ट ऑफ़ डॉसिटैक्सेल यूज़िग वैलिडेटेड LC-MS/MS मेथड संदीप के सिंह, ममनूर राशिद, के एस आर राजू, मो. यासीन मलिक, स्वाति चतुर्वेदी सदफ़ जहाँ और वहाजुद्दीन
- प्री क्लीनिकल फ़ार्माकोकाइनेटिक स्टडीज़ ऑफ़ ए नॉवेल ऐण्टीकैन्सर कंपाउंड S007-1235, एस जैसवाल, ए शर्मा, एम शुक्ला, टी अख्तर, ए कुमार, जे लाल
- फार्माकोकाइनेटिक-फ़ार्माकोडाइनमिक मॉडलिंग ऑफ़ फ्यूरोसेमाइड इन स्पॉन्टेनियसली हाइपर टेन्सिव ऐण्ड DOCA-सॉल्ट इन्ड्यूज़्ड हाइपरटेन्सिव रैट्स, एम शुक्ला, ए जैसवाल, ए शर्मा, एम जैन, के हनीफ़ जे लाल

मलेरिया पैरासाइट बायोलॉजी : ड्रग डिजाइनिंग ऐण्ड वैक्सीन डिवेलपमेन्ट, अहमदाबाद, भारत (9-10 सितंबर)

- फंक्शनल कैरेक्टराइज़ेशन ऑफ़ प्लाजमोडियम बर्गी निकोटिनऐमिडेज़ (nic) बाइ रिवर्स जेनेटिक ऐप्रोच, एस आर रेड्डी, एस के कोली, डी सिंह, एम मुलाका, एस मिश्रा, के ए कुमार

फ्रंटियर्स इन लाइफ़ साइंसेज़ पर AS-UOH संयुक्त कार्यशाला, हैदराबाद, भारत (16-17) सितंबर

- रोल ऑफ़ *प्लाज़मोडियम वर्गी* निकोटिनऐमिडेज़ इन ट्रांसमिशन स्टेजेज़ ऑफ़ मलेरिया इम्प्लिकेशन्स फ़ॉर डिवेलपिंग ऐण्टी-मलेरिया ट्रान्समिशन ब्लॉकिंग ड्रग्स एस आर रेड्डी, एस के कोली डी सिंह, एम मलाका, एस मिश्रा, के ए कुमार

बायो एनकैप्सुलेशन पर 24वीं अन्तर्राष्ट्रीय सम्मेलन, लिस्वन, पुर्तगाल (21-23 सितम्बर)

- इम्प्रूव्ड एफीकेसी ऑफ़ बाइकैलुटैमाइड बाइ को डिलीवरी ऑफ़ हेज़पेरेटिन इन प्रॉस्टेट कैन्सर; अभिषेक आर्या, हफ़जा अहमद, सतीश अग्रवाल, अनिल कुमार द्विवेदी

''ओवरकमिंग इन्ट्रैक्टेबल इन्फ़ेक्शस डिज़ीज़ेज़ प्रिवैलैन्ट इन एशियन कन्ट्रीज़ पर 6ठी इण्डो-जैपनीज़ अंतर्राष्ट्रीय संगोष्ठी गोवा (23 और 24 सितम्बर)

- यूज़ ऑफ़ ड्रग डिलीवरी सिस्टम इन एक्सपेरीमेन्टल फ़ाइलेरियासिस शैलजा मिश्रा भट्टाचार्या
- पिन्सर थेराप्यूटिक्स : टार्गेटेड डिलीवरी ऑफ़ ए सिंगल मॉलीक्यूल फ़ॉर होस्ट डायरेक्टेड ऐण्ड बैक्टीरियल थेरेपी इन ए माउस मॉडल ऑफ़ ट्युबरकुलोसिस, अनुराधा गुप्ता दीपक शर्मा, संकेत कुमार पांड्या, राजीव रंजन, पुष्पा गुप्ता, उमेश दत्ता गुप्ता, सदन कुमार, शरद शर्मा अमित मिश्रा

न्यू इनसाइट्स इनटु साइकायट्रिक डिस्ऑर्डर्स थ्रू कम्प्यूटेशनल बायोलॉजिकल ऐण्ड डिवेलपमेन्टल ऐप्रोचेज, कोपेनहैगन, डेनमार्क (25-28 सितम्बर) ब्रेन कॉन्फ्रेन्स

- क्रॉस टॉक बिट वीन कप्पा ओपिऑइड रिसेप्टर एण्ड NMDA: इम्प्लिकेशन इन रिफ्रैक्टरी डिप्रेशन इन माइस, शालिनी डोगरा, अजीत कुमार, प्रेम एन यादव

ट्रेण्ड्स इन बायोमेडिकल रिसर्च (फ़ेलीसिटेशन ऑफ़ प्रो. जी पी तलवार, NII फ़ाउण्डर डायरेक्टर उनके 90वें जन्म दिन पर) नई दिल्ली (2-4 अक्टूबर)

- पिन्सर भूवमेन्ट अगेन्स्ट *एम. ट्युबरकुलोसिस* इन्फ़ेक्शन यूज़िंग ए मॉलीक्युलर दैट इन्ड्यूसेज़ होस्ट मैक्रोफ़ेज़ ऑटोफैजी ऐण्ड हैज़ मॉडरेट ऐण्टी ट्युबरकुलोसिस एक्टिविटी, अनुराधा गुप्ता, दीपक शर्मा, संकेत कुमार पांड्या, राजीव रंजन, पुष्पा गुप्ता, उमेश दत्ता गुप्ता, सदन कुमार शरद शर्मा, अमित मिश्रा

ऐप्लिकेबिलिटी ऑफ़ जेनॉमिक टेक्नोलॉजीज़ पर अन्तर्राष्ट्रीय सम्मेलन, लखनऊ 13 अक्टूबर

- डिसेक्टिंग कैन्सर जीनोम विद मॉडर्न टूल्स, श्रीकान्त कुमार रथ

सेल बायोलॉजी ऑफ़ इनफ़ेक्शन्स पर अन्तर्राष्ट्रीय सम्मेलन नेशनल सेन्टर फ़ॉर बायोलॉजिकल साइंसेज़, बैंगलुरू (13-14 अक्टूबर)

- *प्लाज़मोडियम वर्गी* S14 इज़ एसेन्शियल फ़ॉर ग्लाइडिंग मोटिलिटी ऐण्ड इन्फ़ेक्टिविटी ऑफ़ स्पॉरोज़ॉइट्स, ए घोष, एस के नरवाल, आर गुप्ता, एच एच चौधरी, एस के कोली, के ए कुमार, एस मिश्रा
- प्रोबिंग द फ़ंक्शन ऑफ़ ऐसपार्टिल प्रॉटिऐजेज़, प्लाज़मेप्सिन VII एण्ड VIII इन *प्लाज़मोडियम वर्गी,* बी एस मस्तान, एस के नरवाल, एस डे, एस मिश्रा के ए कुमार
- मॉडुलेशन ऑफ़ होस्ट सेल SUMOylation फ़ैसिलिटेट्स एफ़िशिएण्ट इनफ़ेक्शन ऑफ़ *प्लाज़मोडियम बर्गी* ऐण्ड *टॉक्ज़ोप्लाज़्मा गॉन्डी,* एम मुलाका, डी सिंह, एस आर रेड्डी, बी एस मस्तान, एस मिश्रा, के ए कुमार
- रोल ऑफ़ *प्लाज़मोडियम बर्गी* निकोटिनऐमिडेज़ इन ट्रान्समिशन स्टेजेज़ ऑफ मलेरिया : इम्प्लिकेशन्स फ़ॉर डिवेलपिंग एण्टी मलेरिया ट्रान्समिशन ब्लॉकिंग ड्रग्स, एस आर रेड्डी, एस के कोली, डी सिंह, एम मलाका एस मिश्रा, के ए कुमार
- इवैल्युएशन ऑफ़ रैमनोलिपिड प्रोड्यूसिंग ऐबिलिटी ऑफ़ स्यूडोमोनस स्ट्रेन्स ऐण्ड ऐनालिसिज़ ऑफ़ देयर ऐण्टी बैक्टीरियल ऐक्टिविटी, आलोक के मिश्रा, रिकेश के दुबे, शिवराज एम यवाजी, दिनेश के त्रिपाठी और किशोर के श्रीवास्तव
- नॉन ऐसपार्टेट फ़ॉस्फ़ोरिलेशन ऑफ़ *माइकोबैक्टीरियम ट्युबरकुलोसिस* रिस्पॉन्स रेगुलेटर PrrA. आलोक के मिश्रा, रिकेश के दुबे, शिवराज एम यबाजी, दिनेश के त्रिपाठी और किशोर के श्रीवास्तव

नेशनल कॉन्फ्रेन्स ऑन रीसेन्ट ट्रेण्ड्स इन बायोटेक्नोलॉजी चेन्नई (19-21 अक्टूबर)

- बायोटेक्नोलॉजी फ़ॉर हेल्थ केयर ऐण्ड द चैलेन्जेज़, श्रीकान्त कुमार रथ

बायोक्वेस्ट हैदराबाद, (20-21 अक्टूबर)

- रोल ऑफ़ *प्लाज़मोडियम बर्गी* निकोटिनऐमिडेज़ इन ट्रॉन्समिशन स्टेजेज़ ऑफ़ मलेरिया इम्प्लेकशन्स फ़ॉर डिवेलपिंग एण्टी मलेरिया ट्रान्समिशन ब्लॉकिंग ड्रग्स, एस आर रेड्डी, एस के कोली, डी सिंह एम मुलाका, एस मिश्रा, के ए कुमार

AAPS की 12वीं वार्षिक बैठक और एक्सपोज़ीशन कोलोरेडो कन्वेन्शन सेण्टर, डेनवर (13-17 नवम्बर)

- इवैल्युएशन ऑफ़ द मेकैनिज़म बिहाइंड बायोएनहैन्सिंग पोटेन्शियल ऑफ़ सलेमतहवसए जे लाल, एम शुक्ला, एम वाई मलिक, एस जैसवाल, ए शर्मा, डी के टनपुला, आर गोपानी
- कम्पैरेटिव *इन विट्रो* ऐण्ड *इन वीवो* फ़ार्माकोकाइनेटिक इवैल्युएशन ऑफ़ नैचरल प्रॉडक्ट इन्स्पायर्ड क्विनैज़ोलिनन ऐण्टी लीशमैनियल्स, जे लाल, ए शर्मा, एस जैसवाल, एम शुक्ला एम शर्मा, पी एम एस चौहान
- ए नॉवेल सेल्फ़ नैनोइमल्सीफाइंग लिपिड कैरियर सिस्टम फॉर इनहैन्समेन्ट ऑफ़ ऐण्टीकैन्सर ऐक्टिविटी ऑफ करक्यूमिन एम शुक्ला, एस जैसवाल, ए शर्मा, ए आर्या, ए के द्विवेदी, जे लाल
- नॉवेल सेल्फ़ इमल्सीफाइंग ड्रग डिलीवरी सिस्टम बेयरिंग पैक्लीटैक्सेल फॉर इम्प्रूव्ड बायोअवेलीबिलिटी एण्ड ऐण्टीकैन्सर थेरेपी, जया गोपाल मेहर, अरशद खान पठान, मनीष के चौरसिया
- स्टीरियोसेलेक्टिव इनहिबिशन ऑफ़ साइटोक्रोम P450 2b6 बाइ ए नॉवेल ऐण्टीथ्रॉम्बोटिक ऐजेण्ट, S002-333 इन ह्यूमन लिवर माइक्रोज़ोम्स, मनीषा भटेरिया रचुमलु-रामकृष्ण, साहिथी येराबेल्ली, रबी शंकर भट्टा

ग्लिम्सेज़ ऑफ़ रिसर्च वर्क इन टॉक्सोनॉमी एण्ड एथनोबॉटनी पर राष्ट्रीय सेमिनार सीएसआईआर-एनबीआरआई, लखनऊ (15 नवम्बर)

- NMITLI 118RT + (ए स्टैण्डर्डाइज़्ड एक्सट्रैक्ट ऑफ़ ए न्यू केमेटाइप ऑफ़ *विदैनिया सोम्नीफ़ेरा* (डुनल) फ़ॉस्फोलिड कॉम्प्लेक्सेज़ : ए प्रूडेन्ट थेराप्यूटिक एप्रोच फ़ॉर इम्प्रूव्ड फंक्शनल आउटकम्स इन एक्सपेरीमेन्टल स्ट्रोक, हफ़जा-अहमद, अभिषेक आर्या, सतीश अग्रवाल, राकेश शुक्ला, अनिल कुमार द्विवेदी
- इस्टैवलिशमेन्ट ऑफ़ कैलस कल्चर एफ़िशिएन्ट माइक्रो-प्रोपैगेशन ऐण्ड इन विट्रो बायोसिन्थिसिज़ ऑफ़ ट्रिटरपेनॉइड्स फ्रॉम लीफ़ डिराइव्ड एक्सप्लाण्ट्स ऑफ़ *टैरैक्ज़ेकम ऑफ़िसिनेल*, नेहा साहू, सबा इरशाद सैयदा खातून, मुकेश श्रीवास्तव के आर आर्या

द्वितीय अन्तर्राट्रीय टॉक्सीकोलॉजी कॉन्क्लेव 2016, सीएसआईआर-आईआईटीआर, लखनऊ (15-16) नवम्बर

- 6-हाइड्रोज़ाइडोपैमाइन (6-OHDA) इम्पेयर्स ऐडतट हिपोकैम्पल न्यूरोजेनेसिस एण्ड बिहेवियरल फंक्शन वायाwrt/β- कैटेनिन सिगनलिंग : ए पोटेन्शियल रोल ऑफ़ MK-801 (डिज़ोसिप्लिन) अगेन्स्ट 6-OHDA-इन्ड्यूज़्ड न्यूरोटॉक्सिसिटी, सोनू सिंह आकांक्षा मिश्रा, शुभा शुक्ला
- ग्लाइकोजेन सिन्थेज़ (GSK-3β) इन हिबिशन एन हैन्स माइटोकॉन्ड्रियल बायोजेनेसिस ऐण्ड डोपैमिनर्जिक न्यूरोजेनेसिस लोअर्ड बाई 6-OHDA इन्ड्यूज्ड न्यूरोटॉक्सिसिटी इन रैट्स, आकांक्षा मिश्रा, सोनू सिंह, वीरेन्द्र तिवारी, सोनी जिगनैश मोहन भाई, पारूल शुभा शुक्ला

फंक्शनल जेनॉमिक्स एण्ड एपिजेनॉमिक्स पर अखिल भारतीय सेल बायोलॉजी सम्मेलन और अन्तरर्राष्ट्रीय संगोष्ठी, जीवाजी विश्वविद्यालय, ग्वालियर (17-19 नवम्बर)

- सिग्मा फ़ैक्टर और बायोफिल्म फ़ॉर्मेशन इन माइकोबैक्टीरिया ऐन अनटोल्ड स्टोरी, भूपेन्द्र एन सिंह

एनोवेशन इन बायोलॉजिकल रिसर्च ऑन हेल्थ ऐण्ड डिज़ीज़ेज़, मैसुरू (21-24 नवम्बर)

- HIF-1α इनहिबिटर चेटोमिन इन्ड्यूसेज़ कैसपेज़ मीडिएटेड सेल डेथिन ट्रिपल नेगेटिव ब्रेस्ट कैन्सर, जयन्त देवंगन, सोनल श्रीवास्तव और श्रीकान्ता कुमार रथ

सोसाइटी ऑफ़ बायोलॉजिकल केमिस्ट्स की 85वीं बैठक सीएसआईआर-सेन्ट्रल फूड टेक्नोलॉजीकल रिसर्च इन्स्टीट्यूट मैसुरू, भारत (21-24 नवम्बर)

- कैरेक्टराइज़ेशन ऑफ़ सर्कुलर RNA मॉलीक्यूल सर्कज़िप-2 ऐण्ड इट्स बायो-सिन्थसाइजिंग जीन जिप-2 इन *सी-एलेगैन्स* मॉडल ऑफ़ एज एसोसिएटेड पार्किन्सन्स डिज़ीज़ ललित कुमार, शम्सुज़्ज़मा और आमिर नाजिर
- पार्किन्सन्स डिज़ीज़ एसोसिएटेड पाथवेज़ में बी रेगुलेटेड बाइ miRNA let-7 : स्टडीज़ एम्प्लॉइंग ट्रान्सजेनिक *सी-एलेगैन्स* एक्सप्रेसिंग ह्यूमन α-सिन्यूक्लीन, शम्सुज़्ज़का, ललित कुमार और आमिर नाज़िर
- प्रोटीन टाइरोज़िन ''फ़ॉस्फैटेम इन कैनॉरहैबडाइटिस एलेगैन्स जीनॉम इम्प्लिकेशन्स इन एज एसोसिएटेड न्यूडिजेनरेटिव डिज़ीज, सूबिया फातिमा और आमिर नाज़िर, एज एसोसिएटेड न्यूरोप्रोटेक्टिव इफ़ेक्ट ऑफ़ सर्ट्युन्स : एम्प्लॉइंग ट्रान्सजेनिक *सी-एलेगेंस* मॉडल एक्सप्रेसिंग ह्यमन अल्फ़ा सिन्यूक्लीन, तन्वी भागेल, सूबिया फ़ातिमा, अभिषेक सिंह, पूजा जडिया और आमिर नाज़िर

ड्रग डिस्कवरी और डिवेलपमेन्ट 2016 पर वर्ल्ड काँग्रेस आईआईएससी, बंगालुरू (23-25 नवम्बर)

- नॉन कार्बोनिल *करक्यूका लाँगा* [NCCL] प्रोटेक्ट्स हार्ट फ्रॉम मामोकार्डियल इश्कीमिया/रिपर्फ़्यूज़न इंजरी वाई रिड्यूसिंग एण्डोथिलायल माइक्रोपार्टिकल मीडिएटेड इनफ़्लमेशन इन रैट्स, अमित मनहास, दीप्ति त्रिपाठी, भारती बिस्वास, हफ़जा अहमद, दीपिका गोयल, अनिल कुमार द्विवेदी, मधु दीक्षित और कुमार वेलु जगवेलु

XII J-NOST कॉन्फ्रेन्स सीएसआईआर-सीडीआरआई, लखनऊ (24-27 नवम्बर)

- β-कार्बोलिन-डायरेक्टेड रेजियोसेलेक्टिव ऑर्थो-C (sp 2)-H फंक्शनलाइज़ेशन्स ऑफ़ ऐरिल रिंग ऑफ़ ऐरिल (β-कार्बोलिन-1-यिल) मिथेनन्स, शिवलिंगा कोली और ए बत्रा
- ट्रिपल कोऑपरेटिव कैट लिसिस-मीडिएटेड सिंथिसिज़ ऑफ़ पॉलीसाइक्लिक β-कार्बोलिन, बेन्ना डी यादव, एस यू दिघे, आर महर, एस शुक्ला और एस बत्रा
- डोनर ऐक्सेप्टर पाइरैनन डिराइण्ड फ़्लोरेसेन्ट डाइज़ फॉर केमोसेन्सिंग ऐण्ड लाइव सेल इमेजिंग एप्लिकेशन्स, अजय कुमार झा

- सिंथिसिज़ इनैन्शियोमेरिक रेज़ोल्यूशन ऐण्ड बोन ऐनाबोलिक ऐक्टिविटी ऑफ़ मेडीकार्पिन एण्ड S-007-1500, पल्लबी अवस्थी, आशुतोष रघुवंशी दिव्या सिंह और अतुल गोयल
- विजिबल लाइट फ़ोटोकैटलाइज़्ड क्रॉस डिहाइड्रोजेनेरेटिव कपलिंग ऑफ़ N-Aryl-1, 2, 3, 4-ट्रेट्राहाइड्रोआइज़ो-क्विनोलिन्स विद डायजोएनोलेट्स, मि. मुकुन्द एम डी प्रमानिक

आर्गेनिक सिंथिसिज़ पर 21वाँ अन्तरर ट्रीय सम्मेलन (ICOS-21), आईआईटी, मुम्बई (11-16) दिसम्बर

- सिंथिसिज़ ऐण्ड सिंथेटिक यूटिलिटी ऑफ़ 3-नाइट्रोआइसोक्ज़ैजॉल, सुशोभन मुखोपाध्याय, डी बारक और एस बत्रा
- डोनर ऐक्सेप्टर वेस्ड पाइरैनन डिराइव्ड फ़्लोरेसेन्ट डाइज़ फ़ॉर बायोइमेज़िग ऐण्ड केमोसेन्सिंग ऐप्लिकेशन शची मिश्रा, अजय के झा, ए शर्मा, एस उमर, एम सचदेव के मित्रा, डी दत्ता, ए नाज़िर और अतुल गोयल

इण्डियन एसोसिएशन ऑफ़ मेडिकल बायोलॉजिस्ट्स का 40वाँ वार्षिक सम्मेलन पीजीआईएमईआर, चण्डीगढ़ (25-27 नवम्बर)

- प्रोटीन काइनेज़ 9 रेगुलेट्स सेक्सुअल रिप्रोडक्शन इन प्लाज़मोडियम : ए नॉवेल मलेरिया ट्रान्समिशन ब्लॉकिंग ड्रग टार्गेट, एस के नरवाल जे टोगिरी, एस के कोली, ए घोष, एच एच चौधरी, बी एस मस्तान, एस आर रेड्डी, के ए कुमार, एस मिश्रा

J NOST 2016, लखनऊ (24-27 नवम्बर)

- डोनर-ऐक्सेप्टर पाइरैनन डिराइण्ड फ़्लोरेसेन्ट डाइज़ फॉर केमोसेन्सिंग ऐण्ड लाइन सेल इमेंजिंग ऐप्लिकेशन्स अजय कुमार झा
- सिंथसिज़, इनैनशियोमेरिक रेज़ोल्यूशन ऐण्ड बोन ऐनाबोलिक एकक्टिविटी ऑफ़ मेडीकार्पिन एण्ड S-007-1500 पल्लवी अवस्थी अशुतो ा रघुवंशी, दिव्या सिंह और अतुल गोयल

फ्रंण्टियर्स इन केमिकल साइसेज़ 2016, डिपार्टमेण्ट ऑफ़ केमिस्ट्री, आईआईटी, गुवाहाटी (8-10 दिसम्बर)

- सिनर्जिस्टिक कैटालिसिस टुवर्ड्स मल्टीकॉम्पोनेन्ट कैसकेड C-C एण्ड C-S/C-C बॉण्ड फ़ॉर्मेशन रिचा सिंह, योगेश थोपाटे और अरूण के सिन्हा

सोसाइटी ऑफ़ न्यूरोकेमिस्ट्री, इण्डिया की 30वीं वार्षिक बैठक हैदराबाद (9-10 दिसम्बर)

- नेक्स्ट जेनरेशन ऑफ़ ऐण्टीडिप्रेसैन्ट्स ''कप्पा ओपिऑइड्स'' प्रेम एन. यादव

ऑर्गेनिसिन्थिसिज पर 21वाँ अन्तरर्राष्ट्रीय सम्मेलन (ICOS 2016) मुम्बई (11-16) दिसम्बर

- डोनर ऐक्सेप्टर बेस्ड पाइरैनन डिराइण्ड फ़्लोरेसेन्ट डाइज़ फ़ॉर बायो इमेजिंग ऐण्ड केमोसेन्सिंग ऐप्लिकेशन शची मिश्रा, अजय के झा, ए शर्मा, एस उमर, एम सचदेव, के मित्रा, डी दत्ता, ए नाज़िर और अतुल गोयल

नेशनल कॉन्फ्रेन्स ऑन रीसेन्ट ऐडवान्सेज़ इन वायोमेडिकल साइंस : डायग्नॉसिस एण्ड रिसर्च एण्ड 2nd ऐनुअल स्कॉलर्स साईस मीट ऑफ़ SDMLS, दिल्ली (16 दिसंबर)

- इन विट्रो एण्ड इन वीवो ऑक्सिसिटी इवैल्युएशन ऑफ़ डाइ-एथिलीन ग्लाइकॉल मोनोइथाइल ईथर, सोनल श्रीवास्तव निधि गुप्ता नवोदयम् केल्लेटी और श्री कान्ता कुमार रथ

इण्डियन फ़ार्माकोलॉजिकल सोसाइटी का 26वाँ वार्षिक सम्मेलन, पं. बंगाल शाखा, कोलकता (17 दिसंबर)

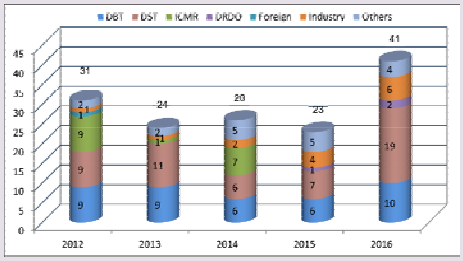
- न्यूरो प्रोटेक्टिव इफ़ेक्ट्स ऑफ NMITLI 118RT+ वाया लिपिड डिलीवरी फ़ॉर द थेरेपी ऑफ़ सेरेब्रल ईश्मिया हफ़ज़ा अहमद, अभिषेक आर्या, सतीश अग्रवाल, राकेश शुक्ला, अनिल कुमार त्रिवेदी

भारत में ट्युबरकुलोसिस रिसर्च पर आईआईएससी संगोष्ठी, बंगालुरू (19 दिसम्बर)

- इनहेलेबल पार्टिकल्स टार्गेटिंग लंग मैक्रोफ़ेजेज़, रोली शर्मा, पवन मुत्तिल, अवध बी यादव, राहुल के वर्मा जतिन्दर कौर, अमित के सिंह, अनुराधा गुप्ता, मृदुल मोहन, अतुल अग्रवाल, संकेत पांड्या, राजीव रंजन, आशीष श्रीवास्तव, ए के बालापुरे, वी के बाजपेई, एस के रथ, शरद शर्मा, स्मृति भदौरिया, सारिका सिंह, डी एस उपाध्याय, विवेक भोसले, अशीम घटक, यू मणि, बी पी चौधरी, आर सी मूर्ति, सुदर्शन के अरोड़ा, हिमाद्रि सेन, राकेश सिन्हा, जे सूर्य कुमार, वी. मोदक, आर विनीत, पुष्पा गुप्ता, उमेश डी गुप्ता, अमित मिश्रा

मेटल्स इन जेनेटिक्स, केमिकल बायोलॉली ऐण्ड थेराप्यूटिक्स पर अन्तरर्राष्ट्रीय सम्मेलन, आईआईएससी, बैंगलुरू (17-20 फरवरी, 2016)

- आईडेन्टीफ़िकेशन ऑफ़ TANK एण्ड GRP78 ऐज़ मॉलीक्युलर टार्गेट्स ऑफ़ मेडीकार्पिन इन कैलवेरियल ओस्टियोब्लास्ट सेल्स वाया प्रोटियोमिक्स, मनीषा दीक्षित, ज्योति कुरील, ऐजाज अहमद जॉन, आशुतोष रघुवंशी अतुल गोयल और दिव्या सिंह



नेटवर्क्स एवं लिंकेजेज

1. मिशन मोड परियोजनाएं (FTT)

क्रम सं.	कोड नं.	परियोजना शीर्षक	प्रधान अन्वेषक	प्रारंभ होने की तिथि	संकलन की अनुमानित तिथि
1.	MLP 0103	ऐप्टी ओस्टियोपोरोसिस कैण्डीडेट ड्रग 99/373	डा अशीम घटक	21.07.2016	20.07.2018
2.	MLP 0104	ऐप्टी मलेरियल कैण्डीडेट ड्रग 97/78	डा अशीम घटक	21.07.2016	20.07.2018
3.	RSP 4040	सीएसआईआर रूरल डेवल्पमेंट ऐक्टिविटीज़	श्री विनय त्रिपाठी	08.11.2016	07.11.2017

2. 12वीं पंचवर्षीय योजना की सीएसआईआर नेटवर्क परियोजनाएं (2012-2017)

क्रम सं.	कोड सं.	ऐक्रॉनिम	परियोजना शीर्षक	नोडल ऑफिसर सीएसआईआर-सीडीआरआई
1	बीएससी0201	अस्थि	ऐनाबोलिक स्केलेटल टार्गेट्स इन हेल्थ एण्ड इलनेस (सीएसआईआर-सीडीआरआई, नोडल लैब)	डॉ नैवेद्य चट्टोपाध्याय
2	बीएससी0101	प्रोग्राम	फ़ैक्टर्स गवर्निंग कॉम्पीटेन्ट गेमीट प्रोडक्शन एण्ड रिप्रोडक्टिव डिस्फ़ंक्शन (सीएसआईआर-सीडीआरआई, नोडल लैब)	डॉ राजेन्द्र सिंह
3	बीएससी0102	थन्डर	टुवर्ड्स होलिस्टिक अण्डरस्टैन्डिंग ऑफ़ कॉम्प्लेक्स डिज़ीज़ेज़: अनरैवलिंग द थ्रेडस ऑफ़ कॉम्प्लेक्स डिज़ीज़ेज़ (सीएसआईआर-सीडीआरआई, नोडल लैब)	डॉ मनोज बर्थवाल
4	बीएससी0103	अनडू	न्यू ऐप्रोचेज़ टुवर्ड्स अण्डरस्टैन्डिंग ऑफ़ डिज़ीज़ डायनमिक्स एण्ड टु ऐक्सेलरेट ड्रग डिस्कवरी (सीएसआईआर-सीडीआरआई, नोडल लैब)	डॉ एसके रथ
5	बीएससी0104	स्प्लेन्डिड	इमर्जिंग एण्ड री-इमर्जिंग चैलेन्ज़ेज इन इनफ़ेक्शियस डिज़ीज़: सिस्टम बेस्ड ड्रग डिजाइन फ़ॉर इन्फ़ेक्शियस डिज़ीज़ेज़ (सीएसआईआर- सीडीआरआई, नोडल लैब)	डॉ आर रविशंकर
6	बीएससी0106	बायोप्रॉस्पर	बायो प्रॉस्पेक्शन ऑफ़ प्लाण्ट रिसोर्सेज़ एण्ड अदर नैचुरल प्रॉडक्ट्स (सीएसआईआर-एनबीआरआई, नोडल लैब)	डॉ दीपक दत्ता
7	बीएससी0108	मेडकेम	मेडिसिनल केमिस्ट्री फ़ॉर स्टेम सेल बायोलॉजी एण्ड रिजेनरेटिव मेडिसिन्स (सीएसआईआर-आईआईआईएम, नोडल लैब)	डॉ अतुल कुमार
8	बीएससी0111	इनडेप्थ	इन्टीग्रेटेड नेक्स्टजेन ऐप्रोचेज़ इन हेल्थ, डिज़ीज़ एन एनवायरमेन्टल टॉक्सिसिटी (सीएसआईआर-आईआईटीआर, नोडल लैब)	डॉ बीएन सिंह
9	बीएससी0112	नैनोशी	नैनो-मटीरियल्स: ऐप्लिकेशन्स एण्ड इम्पैक्ट ऑन सेफ़्टी हेल्थ एण्ड एनवॉयरमेन्ट (सीएसआईआर-आईआईटीआर, नोडल लैब)	डॉ अमित मिश्रा
10	बीएससी0113	अन्सीन	अण्डरस्टैण्डिंग सुप्रा-मॉलीक्युलर एनसेम्बल्स एण्ड मशीन्स (सीएसआईआर-आईआईसीबी, नोडल लैब)	डॉ आशीष अरोड़ा
11	बीएससी00114	होप	अण्डरस्टैण्डिंग द रोल ऑफ़ होस्ट मॉलीक्यूल्स इन पैरासिटिक इन्फ़ेक्शन्स (सीएसआईआर-आईआईसीबी, नोडल लैब)	डॉ अनुराधा दुबे
12	बीएससी0115	माइन्ड	न्यूरोडिजेनरेटिव डिज़ीज़ : कॉज़ एण्ड करेक्शन्स (सीएसआईआर-आईआईसीबी, नोडल लैब)	डॉ शुभा शुक्ला
13	बीएससी0118	एपिहेड	एपिजेनेटिक इन हेल्थ एण्ड डिज़ीज़ (सीएसआईआर-सीसीएमबी, नोडल लैब)	डॉ आमिर नाज़िर
14	बीएससी0119	हम	अण्डरस्टैण्डिंग द ह्यूमन माइक्रोबायोम (सीएसआईआर-इमटेक, नोडल लैब)	डॉ अरुणव दासगुप्ता
15	बीएससी0120	बायोडिस्कवरी	सेन्टर फ़ॉर बायोथेराप्यूटिक मॉलीक्यूल डिस्कवरी (सीएसआईआर-इमटैक, नोडल लैब)	डॉ जे के घोष
16	बीएससी0121	जेनेसिस	जेनॉमिक्स एण्ड इन्फ़ॉर्मेटिक्स सोल्यूशन्स फ़ॉर इन्टीग्रेटिंग बायोलॉजी (सीएसआईआर-इमटेक नोडल लैब)	डॉ एम आई सिद्दीकी

क्रम सं.	कोड सं.	ऐक्रॉनिम	परियोजना शीर्षक	नोडल ऑफिसर सीएसआईआर-सीडीआरआई
17	बीएससी0123	जीनकोड	जीनोम डायनमिक्स इन सेल्युलर ऑर्गनाइज़ेशन, डिफ़रेन्सिएशन एण्ड इनैन्शियोस्टैट्टिस (सीएसआईआर-आईजीआईबी, नोडल लैब)	डॉ डब्ल्यू हक
18	सीएससी0302	एड	एडवांस ड्रग डिलीवरी सिस्टम (सीएसआईआर-आईआईसीटी नोडल लैब)	डॉ मनीष कुमार चौरसिया
19	इएससी0103	बायोसेरैम	डिवेल्पमेन्ट ऑफ़ नॉवेल सीएसआईआर टेक्नोलॉजी फ़ॉर मैन्युफ़ैक्चरिंग टेलर्ड एण्ड पेशेण्ट स्पेसिफ़िक बायो-सेरेमिक इम्प्लाण्ट्स बायोमेडिकल डिवाइसेज़ ऐट एफ़ोर्डेबल कॉस्ट (सीएसआईआर-सीजीसीआरआई, नोडल लैब)	डॉ पीआर मिश्रा
20	आइएससी0102	नोगेट	सीएसआई नॉलेज़ गेटवे ओपन सोर्स प्राइवेट क्लाउड इन्फ़्रास्ट्रक्चर, निस्केयर, नोडल लैब	श्री सुमन मलिक

3. अनुदान परियोजनाएँ

शीर्षक	प्रधान अन्वेषक	प्रारंभ करने की तिथि	पूर्ण होने की संभावित तिथि
जैव प्रौद्योगिकी प्रभाग			
स्ट्डी ऑफ़ ब्रेन इन्स्युलिन/इन्स्युलिन रिसेप्टर इन ग्लायल सेल ड्युरिंग न्यूरोइनफ़्लमेशन (नैशनल इनीशिएटिव ऑन ग्लायल सेल रिसर्च इन हेल्थ एण्ड डिज़ीज़)	डॉ राकेश शुक्ला	25.04.2012	24.04.2015
टु स्ट्डी द एक्टिवेशन ऑफ़ ग्लायल सेल इन क्रोनिक हाइपरटेंशन (नैशनल इनीशिएटिव ऑन ग्लायल सेल रिसर्च इन हेल्थ एण्ड डिज़ीज़)	डॉ काशिफ़ हनीफ़	25.04.2012	24.04.2015
सोल्यूशन स्ट्रक्चर एण्ड डायनमिक्स ऑफ़ Unc-60 एडीएफ/कॉन्फ़िलिन प्रोटीन्स ऑफ़ *सीनोरैब्डाइटिस एलेगैन्स*	डॉ आशीष अरोड़ा	24.08.2012	23.08.2016
ड्रग अगेन्स्ट सेन्ट्रल बॉडी फ़ैटनेस एण्ड इन्स्युलिन रेज़िस्टेन्स (हाईजलपेरी/पोस्ट मेनोपॉलत प्रिवैलेन्स) RGYI	डॉ जे आर गाइन	12.09.2012	11.09.2016
बायोटेक्नोलॉजीकल इन्टरवेन्शन फॉर फार्मास्यूटिकली वेल्युएबल कंपाउन्ड्स फ्रॉम फॉरेस्ट रेजिन्स	डॉ राकेश शुक्ला	01.05.2013	30.04.2016
मॉलीक्युलर कैरेटराइज़ेशन एण्ड ऐपिडेमिऑलोज़िकल मॉडलिंग ऑफ़ एण्टी माइक्रोबियल रेस्टिन्स एट द इण्टर फेस ऑफ़ एनिमल ह्यूमन प्लाण्ट पैथॉजन कन्टीन्युअम	डॉ रबी शंकर भट्टा	15.04.2013	14.04.2016
रोल ऑफ़ miRNAs रिस्पॉन्सिबल फॉर बोन मास रिवर्सल एट द टाइम ऑफ़ वीनिंग	डॉ रितु त्रिवेदी	20.05.2013	19.05.2016
कैरेक्टराइज़ेशन ऑफ़ द रोल ऑफ़ ह्यूमन डीएनए लाइगेज। इन लैगिंग स्ट्रैन्ड डीएनए सिन्थिसिज़ एण्ड डीएनए रिप्लिकेशन (RGYI)	डॉ दिब्येन्दु बेनर्जी	10.06.2013	09.06.2016
एन एप्रोच टुवार्ड्स आइडेण्टिफिकेशन एण्ड सिंथेसिस ऑफ एण्टिजेनिक एपिटोप्स ऑफ पोटेन्शियल *एल. डोनोवनी* टीएच1 स्टीमुलेटरी प्रोटीन्स फॉर द डेवलपमेंट ऑफ सिंथेटिक वेक्सीन अगेंस्ट विसरल लिश्मेनिएसिस	डॉ ए ए सहस्रबुध्दे	20.06.2013	19.06.2016
इल्यूसिडेटिंग द रोल ऑफ़ पी53 एण्ड डीएनए डैमेज रिस्पॉन्स पॉथवे इन एण्टी कैंन्सर एक्टिविटी ऑफ़ ए नॉवेल कूमारिन चाल्कोन हाइब्रिड	डॉ जयन्त सरकार	20.06.2013	19.12.2013
स्ट्डीज ऑन इफ़ेक्ट ऑफ़ डिफ़रेन्ट हर्बल प्रिपरेशन ऑन वून्ड हीलिंग एण्ड एन्ज़ियोजेनेसिस	डॉ सैयद मुस्तफ़ा	15.07.2013	14.07.2016
डिस्कवरिंग एण्टिमलेरियल फ्रॉम मेरीन ऑर्गेनिज्म्स (फेज-III) बल्क रिकलेक्शन ऑफ प्रोमिसिंग मेरीन ऑर्गेनिज्म्स-आइसोलेशन, प्यूरिफिकेशन, केरेक्टराइजेशन एण्ड केमिकल सिंथेसिस ऑफ मेरीन डिराइव्ड एण्टिमलेरियल	डॉ ए के सिन्हा	01.04.2012	31.03.2015
जेनेटिक मैनीपुलेशन एण्ड ड्रग टार्गेटिंग एप्रोचेज़ अगेन्स्ट *प्लाज़्मोडियम बर्गी* स्पॉरोजोइट प्रोटीन्स S14, सिरीन थ्रिंयोनाइन प्रोटीन, काइनेज़-9 एण्ड लिवर स्टेज, स्पेसिफ़िक ऐसिल-CoA सिन्थेज़	डॉ सतीश मिश्रा	10.10.2013	09.10.2018
इन्वेस्टीगेटिंग द एक्स्ट्रा-रिबोज़ोमल फ़ंक्शन्स ऑफ़ रिबोज़ोमल प्रोटीन्स ड्यूरिंग स्ट्रेस एण्ड इन्फेक्शन	डॉ नीति कुमार	13.11.2013	12.11.2018
असेम्बली ऑफ़ आयरन सल्फ़र [Fe-S] क्लस्टर्स ऑन क्रिटिकल प्रोटीन्स ऑफ़ द प्लाज़्मोडियम एपिकोप्लास्ट	डॉ समन हबीब	11.10.2013	10.10.2018

शीर्षक	प्रधान अन्वेषक	प्रारंभ करने की तिथि	पूर्ण होने की संभावित तिथि
डिस्कवरी एण्ड डिवेलपमेन्ट ऑफ़ नॉवेल बोन एनाबोलिक एजेण्ट्स फॉर एक्सीलेरेटेड फ्रैक्चर हीलिंग	डॉ नैबेद्य चट्टोपाध्याय	21.02.2014	21.02.2016
आइडेण्टीफिकशन एण्ड फ़ंक्शनल कैरेक्टराइज़ेशन ऑफ़ नॉवेल माइक्रो RNA कैण्डीडेट्स आल्टर्ड बाई फ़ाईटोएस्ट्रोजेनः रोल इन द पेथोजेनेसिस ऑफ ऑस्टियोपोरोसिस	डॉ दिव्या सिंह	01.08.2014	31.01.2017
स्ट्डीज़ ऑन द इन्टरैक्शन्स बिटवीन माइकोबैक्टीरिया एण्ड होस्ट डिफेन्स पेप्टाइड्स	डॉ मुकेश पसुपुलेती	01.10.2014	30.09.2017
miRNA इन द रेगुलेशन ऑफ़ स्क्लेरोस्टिन ए थेराप्यूटिक एप्रोच फ़ॉर ओस्टियोपोरोसिस (वीमेन साइंटिस्ट स्कीम)	डॉ शर्मिष्ठा भट्टाचार्य और डॉ एन चट्टोपाध्याय	26.09.2014	25.09.2014
एक्सप्लोरेशन ऑफ़ इण्टरल्यूकिन 1 रिसेप्टर एसोसिएटेड काइनेज (IRAK) फैमिली ऑफ़ काइनेज़ ड्यूरिंग मैक्रोफेज़ फ़ोम सेल फॉर्मेशन एण्ड इनफ्लमेशन	डॉ मनोज कुमार बर्थवाल	22.10.2014	22.10.2017
मॉलीक्यूलर एण्ड बायोकेमिकल कैरेक्टराइजेशन ऑफ़ चेपरॉनिन क्लास ऑफ़ हीट शॉक प्रोटीन्स ऑफ़ *लीश्मैनिया डोनोवनी*, देयर एक्सप्लोरेशन ऐज़ ड्रग टार्गेट	डॉ नीना गोयल	24.12.2014	23.12.2017
क्वेस्ट फॉर कोरन्यूलिन बेस्ड पॉलिफंक्शनल मोलिक्यूल्स इन नेनोबायोटेक्नोलॉजी एण्ड नेनोमेडिसिनः ट्रांसपोर्टिंग एण्ड ट्रांसलोकेटिंग प्रोपर्टीज ऑफ कोरन्यूलिन डिराइव्ड कैरियर सिस्टम्स	डॉ गौतम पाण्डा	24.03.2015	23.03.2018
प्रोफाइलिंग एण्ड कैरेक्टराइजेशन ऑफ अर्ली फेज डिफरेन्शियल-एमआई-आरएनए(ज) रिस्पान्सिबल फॉर डाउनस्ट्रीम डेवलपमेन्ट ऑफ इन्सुलिन रेजिस्टेन्स इन Hmsc डिराइव्ड-एडिपोसाइट्स	डॉ अनिल एन गायकवाड	24.12.2014	23.12.2017
टिश्यू स्पेसिफिक ट्रांसक्रिप्ट्स एण्ड कार्डिकल ग्लाइकोसाइड प्रोफाइलिंग ऑफ केलोट्रॉपिस प्लाण्ट आफ्टर डिफरेण्ट बायोटिक एण्ड एबायोटिक एलिसिटर	डॉ विनीता त्रिपाठी	20.04.2015	19.04.2018
मेकेनिस्टिक सटडीज ऑन नेफ्थाक्विनोन बेस्ड एण्टिकेन्सर एजेन्ट्स इन ब्रीस्ट कैंसर	डॉ डी पी मिश्रा	29.07.2015	28.07.2018
अन्डरस्टेंडिंग द रोल ऑफ पॉली (एडीपी-राइबोज) पॉलीमरेज ऑन टाइट जंक्शन्स फंक्शनिंग ड्यूरिंग कार्सिनोजेनेसिस-(बायो-केयर फेलो स्कीम)	डॉ ज्योतिका राजावत एवं डॉ डी पी मिश्रा	16.04.2015	25.09.2016
डिज़ाइन डेवलप्मेंट एण्ड परफ़ॉर्मेंस रवैल्युएशन ऑफ हाइब्रिड सिस्टम्स कम्प्राइजिंग नॉवेल कटायनिक लिपिड्स इन्टेन्डेड टू डिलीवर थेराप्यूटिक siRNA टु सॉलिड ट्यूमर्स	डॉ मनीष के चौरसिया	15.02.2016	14.02.2019
मेसेनकाइमल स्टेम सेल्स विद ए पॉलीनरिक स्कफ़ल्ड में इम्प्रव कार्डियैक फ़ेक्शन इन ए माइड्स मायोकार्डियल मॉडल	डॉ मधु दीक्षित	03.05.2016	02.05.2018
रन्डक्शन ऑफ़ आटोफ़ैजी ऐज ए स्ट्रैटजी फ़ॉर ट्रीटमेंट ऑफ़ ट्युबर कुलोसिस	डॉ अमित मिश्रा	01.06.2016	31.05.2019
डिसिफ़रिंग द रोल्स ऑफ सीक्रेटेड प्रोटियाज़ेज इन होस्ट माइकोबैक्टीरियम ट्लुवर कुलोसिस इन्टरैक्शन : इम्प्लिकेशंस फ़ॉर नाबेल ड्रग डिस्कवरी एण्ड वैक्सीन डेवलेपमेंट	डॉ सचिन कुमार	13.07.2016	12.07.2020
RhoA GT Pase इन न्यूट्रोफ़िल केमेटैक्सिस एण्ड फ़ैक्शंस ड्यूरिंग इन्फ्लमेशन	डॉ सचिन कुमार	31.05.2016	30.05.2021
डेवलप्मेंट ऑफ़ टोकोफ़ेरॉल सक्सीनेट ऐंकॉर्ड नैनो कॉन्सट्रक्ट्स बेरिंग पैक्लीटैक्सेल फ़ॉर सिनर जिसिटक एफिकेसी अगेन्स्ट बोन मेटेस्टैटिक ब्रेस्ट कैंसर : क्रॉसटॉक बिटवीन ब्रेस्ट कैंसर एण्ड बोन	डॉ पी आर मिश्रा	29.07.2016	28.07.2017
इन्डक्शन ऑफ माइटोकॉन्ड्रियल सेल डेथ एण्ड रिवर्सल ऑफ़ एण्टी कैंसर ड्रग रेजिस्टेंस वाया मल्टीफ़ंक्शनल इम्यूनोचेराप्यूटिक नैनो इमल्शन	डॉ मनीष के चौरसिया	03.10.2016	02.10.2019
अंडरबैंडिंग द रोल ऑफ RBR-E3 यूबिक्विटिन लिगेस इन पी. फ़ैल्सीपेरम एण्ड एक्सप्लोरिंग इट्स पोटेंशियल फॉर फ़ार्माकोलॉजिकल इण्टरवेंशन	डॉ नीति कुमार	08.11.2016	07.11.2019
इवैल्युएशन TGF-β मीडिएटेड सिग्नलिंग मेकैनिज़म इन द एण्डोमीट्रिआंसिस यूजिंग माउस मॉडल	डॉ राजेश कुमार झा	08.11.2016	07.11.2019
सिंथिसिज़ एण्ड एण्टी पैरासिटिक एक्टिविटीज़ ऑफ क्विनोलिन - टेट्राहाइड्रोपिरीमिडीन हाइब्रिड्स विद स्पेशल रिफ़रेन्स टु एण्टी मलेरियल, एण्टी लीशमैनियल एण्ड एण्टी फ़ाइलेरियल ऐक्टिबिटीज़	डॉ रेणु त्रिपाठी	13.10.2016	12.10.2019
विज्ञान एवं प्रौद्योगिक प्रभाग			
सोफ़िस्टिकेटेड एनालिटिकल इन्स्ट्रूमेन्ट फ़ैसिलिटी (सैफ)	निदेशक	01.04.1975	दीर्घ अवधि
अण्डरस्टैन्डिंग द मेकैनिज़म ऑफ़ एण्टी-कॉर्सिनोजेनिक इफ़ेक्ट ऑफ अल्फ़ा-सोलोनिन	डॉ जयन्त सरकार	01.10.2012	30.09.2015
एक्सप्लोरशन ऑफ़ पोटेन्सी, एफ़ीकेसी एण्ड मोड ऑफ़ एक्शन ऑफ़ *अल्मस वॉलिचियाना* अगेन्स्ट हाइपरटेन्शन	डॉ जेआर गाइन	01.10.2012	30.09.2015
इवैल्युएशन ऑफ़ वीक डाइपोल-डाइपोल इन्टरैक्शन्स इन मॉलीक्युलर सॉलिड्स बाइ मीन्स ऑफ़ एक्सपेरीमेन्टल चार्जेज़ डेन्सिटी स्ट्डीज़ एण्ड कम्प्यूटेशनल मेथड्स	डॉ टीएस ठाकुर	07.11.2012	06.11.2015

शीर्षक	प्रधान अन्वेषक	प्रारंभ करने की तिथि	पूर्ण होने की संभावित तिथि
सेल ऑफ एस्ट्रोजन(स) इन्ड्यूज्ड रीडॉक्स अल्टरेशन्स इन ब्रीस्ट कार्सिनोजेनेसिस	डॉ स्मृति भदौरिया	01.01.2013	31.12.2016
रोल ऑफ़ इन्टेग्रिन 8-Fas एण्ड FAK सिग्नलिंग इन द एन्डोमीट्रियल एपिथेलियल सेल फ़िज़ियोलॉजी ड्यूरिंग यूटराइन टिश्यू रीमॉडलिंग प्रोसेस	डॉ राजेश कुमार झा	27.02.2013	26.02.2016
फ़ंक्शनल कैरेक्टराइज़ेशन ऑफ़ फिजन यीस्ट क्लीवेज एण्ड पॉलीऐडिनाइलेशन फ़ैक्टर सब यूनिट RNA14 एण्ड इट्स इम्प्लिकेशन ऑन सेल साइकिल चेक पाइण्ट पाथवे	डॉ शकील अहमद	15.03.2013	14.03.2016
आइडेन्टीफ़िकेशन एण्ड कैरेक्टराइजेशन ऑफ़ स्मॉल मॉलीक्यूल इनहिबिटर्स ऑफ़ ह्यूमन डीएनए लाइगेज़ेज पोटेन्शियल एण्टी कैंसर एजेण्ट्स	डॉ दिब्येन्दु बेनर्जी	03.06.2013	02.06.2016
मॉलीक्युलर डिसेक्शन ऑफ़ सिग्नल ट्रांसडक्शन ईवेन्ट्स इन्वॉल्व्ड इन होस्ट डिफ़ेन्स अगेन्स्ट एक्सपेरीमेन्टल विसरल लीशमैनियासिस	डॉ सुशांत कार	20.06.2013	19.06.2016
डेसिफरिंग द रोल ऑफ Ccr4-Not कॉम्पलेक्स इन ह्यूमन मलेरिया पेरासाइट *प्लाज्मोडियम फेल्सिपैरम* (इन्सपायर स्कीम)	डॉ मनीष गोयल	10.06.2013	09.06.2018
थेरेप्यूटिक इवेल्यूशन ऑफ फेटल ओस्टियो-प्रोजेनिटर स्टेम सेल इन रैट मॉडल ऑफ ओस्टियोपोरोसिस (SERB DST फास्ट ट्रेक स्कीम)	डॉ दीपशिखा तिवारी	30.07.2013	29.07.2016
डिकंस्ट्रक्टिंग कॉर्टिकोस्ट्राइटल सर्किटः इम्पलिकेशन इन एक्जिक्यूटिव फंक्शन	डॉ प्रेम एन यादव	01.11.2013	31.10.2016
टायरोसीन हायड्रोलेज एज पोटेन्शियल ड्रग टार्गेट इन पर्किन्सन्स डिजीजः स्टडीज विथ जेनेटिक नॉकडाउन मॉडल ऑफ सी	डॉ आमिर नाजिर	01.11.2013	31.10.2016
क्लोनल मल्टीप्लिकेशन ऑफ़ इण्डियन ट्रेडीशनल प्लाण्ट *अल्मस वालिचियाना* प्लैनकॉनः एन इन्डेन्जर्ड ट्री फॉर हीलिंग फ्रैक्चर	डॉ के आर आर्या	17.10.2013	16.10.2015
क्वालिटेटिव एण्ड क्वान्टिटेटिव एनालिसिस ऑफ़ बायोऐक्टिव अल्कलॉइड्स इन *बर्बेरिस* एण्ड *महोनिया* स्पेशीज़ एण्ड यूज़ ऑफ़ पीसीए फ़ॉर मार्कर आइडेन्टीफिकेशन	डॉ बृजेश कुमार	17.10.2013	16.10.2015
प्रोबिंग इलेक्ट्रोफ़िलिक साइक्लाइज़ेशन ऑफ़ एल्किनॉल्स एण्ड ऐल्किलएमीन्स फ़ॉर द सिन्थिसिज़ ऑफ़ वेरिअस हेट्रोसाइक्लिक कम्पाउण्ड्स	डॉ मड्डी श्रीधर रेड्डी	02.12.2013	01.12.2016
आइडेण्टीफ़िकशन ऑफ़ ड्रग टार्गेट्स इन *हेलिकोबैक्टर पाइलोरी* यूज़िंग डुएल-टैग्ड काबोहाइड्रेट्स	डॉ पिन्टू कुमार मण्डल	01.03.2014	28.02.2017
टार्गेट ओरिएन्टेड डिलीवरी ऑफ़ केमोथेराप्यूटिक एजेण्ट इन लीशमैनियासिस वाया मैक्रोफ़ेज स्केवेन्ज़र रिसेप्टर्स	डॉ मनीष के चौरसिया	01.06.2014	31.05.2017
एक्सप्लोरिंग द पोटेन्शियल ऑफ हेट्रोडायइनोफाइल इन हॉसर-क्राउस एन्युलेशन	डॉ नम्रता रस्तोगी	01.09.2011	31.08.2014
इन्वेस्टिगेशन्स ऑन द इम्यूनोमाडुलेटरी प्रॉपर्टीज़ ऑफ़ साइक्लिक एण्ड लीनिअर होस्ट डिफ़ेप्स पेप्टाइड्स	डॉ मुकेश पसुपुलेती	10.07.2014	09.07.2017
डिवेलपमेन्ट ऑफ़ कैटलिटिक एसिमीट्रिक फ्लोरिनेशन एण्ड फ़्लोरोसाइक्लाइजेशन रिएक्शन्स	डॉ किशोर मोहनन	01.08.2014	31.07.2017
डिवलपमेन्ट ऑफ़ नॉवेल स्ट्रैटजीज़ टुवर्ड्स द सिन्थिसिज़ ऑफ़ एन-हेट्रोसाइक्ल्स यूजिंग आइसोसायनाइड बेस्ड मल्टीकॉम्पोनेन्ट रिऐक्शन्स	डॉ पीएमएस चौहान	15.05.2014	14.05.2017
मॉलीक्युलर एण्ड फ़ंक्शनल कैरेक्टराइज़ेशन ऑफ MAP काइनेज़1 होमोलॉग ऑफ़ *लीशमैनिया डोनोवनी*	डॉ नीना गोयल	01.01.2015	31.12.2017
RNAi मीडिएटेड फंक्शनल एनालिसिस ऑफ बायोमार्कर फॉर एण्डोमीट्रियल रिसेप्टिविटी (यंग साइंटिस्ट स्कीम)	डॉ रोहित कुमार	06.04.2015	05.04.2018
डेवलपमेंट ऑफ शुगर अमीनो एसिड डिराइव्ड पेप्टाइड्स सेल्फ असेम्बलिंग सिलेक्टिवली ऑन बेक्टीरियल मेम्ब्रेन्स, फार्मिंग आयन पोर्स एण्ड किलिंग बेक्टीरिया इन्क्लुडिंग एमटीबी	डॉ आरएस अम्पापथी एवं डॉ विनीता चतुर्वेदी	20.05.2015	19.05.2018
स्केलेटल इफ़ेक्ट ऑफ़ स्टिमुलेशन ऑफ़ रिसेप्टर ऐक्टिवेटर ऑफ NF-kb लिगेंड (RANKL) फ्रॉम ओस्टियोब्लास्ट बाइथियोफ़िलिन एण्ड द मेकैनिज़्म ऑफ़ एक्शन ऑफ़ ड्रग	डॉ नैवेद्य चट्टोपाध्या	03.06.2015	02.06.2018
E3 यूबिक्विटिन लिगेसेज़ इन ब्रेस्ट कैंसर : आइडेन्टी फिकेशन ऑफ़ नॉवेल इण्टरैक्टिंग प्रोटींस ऑफ़ E3 यूबिक्विटिन लिंगेस E6AP फ्रॉम ब्रेस्ट कैंसर सेल्स	डॉ अरूण कुमार त्रिवेदी	03.06.2015	02.06.2018
डिज़ाइन एण्ड डेवलेप्मेंट ऑफ़ प्लांटस सेकेण्डरी मेटाबोलाइट लाइब्रेरी टु एक्सप्लोर द केमिस्ट्री ऑफ़ मेडिसिन प्लांट्स	डॉ संजीव कनोजिया	01.10.2015	30.09.2018

शीर्षक	प्रधान अन्वेषक	प्रारंभ करने की तिथि	पूर्ण होने की संभावित तिथि
ओरिजिनल बायोकम्पैटिबल फॉस्फोरस डेनड्रिमर्स ऐज ए न्यू स्ट्रैटजी टु टैकल पल्मोनरी ट्युबर कुलोसिस	डॉ के के श्रीवास्तव	16.11.2015	15.11.2018
इन वीवो स्डटीज़ ऑफ GIT एंजाइम रेज़िस्टेन्स इंसुलिन कम्पाउण्ड	डॉ जे आर गाइन	04.01.2016	04.01.2018
डिज़ाइन एण्ड सिंथिसिज ऑफ नैचुरल, अननैचुरल ऐगलांगस ऑफ कैलोथ्रिक्विन्स A, B एण्ड इवैल्युएशन ऑफ एण्टीमलेरियल एण्ड एण्टी कैंसर एक्टिविटी	डॉ कुमकुम श्रीवास्तव	12.01.2016	11.01.2019
डू ट्रांसमेम्ब्रेन प्रोटीन काइनेज एण्ड एक्टिवेशन ट्रांसक्रिप्शन फ़ैक्टर 4 एण्ड 6 (ATF 4 एण्ड 6) आर इन्वॉल्ड इन न्यूरोनल डेथ?	डॉ सारिका सिंह	07.04.2016	06.04.2019
असेसमेन्ट ऑफ़ द टॉक्सिसिटी पोटेंशियल ऑफ ऐनाबोलिक ऐन्ड्रोजेनिक स्टेरॉइड्स : ए टॉक्सिकोजेनॉमिक एण्ड प्रोटियॉमिक एप्रोच	डॉ प्रभाष कुमार पांडे मेन्टर: डा एस के रथ	18.04.2016	17.04.2016
ऐक्टिविटी गाइडेड आइसोलेशन ऑफ ऐण्टीकैंसर एजेण्ट्स फ्रॉम इण्डियन मेडिसिनल प्लांट्स एण्ड सिंथेटिक मांडीफ़िकेशंस ऑफ़ मेजर बायोएक्टिव कॉन्स्टीट्युमेंट्स	डॉ रशिम गौड़ मेन्टर: डा के वी शशिधरा	01.02.2016	31.01.2018
रिसेप्टर मीडिएटेड को-डिलीवरी ऑफ़ ऐन्टीकैंसर ड्रग एण्ड siRNA टु ओवर कम मल्टीड्रग रेज़िस्टेंस इन ब्रेस्ट कैंसर	डॉ लिपिका रे	02.06.2014	01.06.2017
फ़ंक्शनल इवैल्युएशन ऑफ miRNA रेगुलेटर्स ड्यूरिंग अर्ली एम्ब्रयांनिक डेवलेप्मेंट ऑफ माइस	डॉ अमर नाथ मेन्टर: डा मोनिका सचदेव	01.04.2016	31.03.2018
प्रोटेक्टिव इफेक्ट ऑफ टॉपिकल ऐप्लिकेशन ऑफ़ सेलेकॉक्सिब एण्ड/आर उ-ऐसिटाइल सिस्टीन ऑन डिऑक्ज़ीनिबेलेनॉल माइकोटॉक्सिन इन्ड्यूज्ड स्किन इन्फ्लमेशन, जेनोटॉक्सिसिटी एण्ड ट्यूमरीजेनेसिटी इन माइस	डॉ. साक्षी मिश्रा मेन्टर: डॉ एस के रथ	01.07.2016	30.06.2019
इन्वेस्टीगेशन ऑफ अपटेक एण्ड एफ़लक्स ट्रांसपोर्टर्स रोल इन फ़र्स्ट लाइन प्रेसक्रिप्शन मेडिसिंस एण्ड CDRI कैन्डीडेट ड्रग डिस्पोज़ीशन, पोटेंशियनल ड्रग कॉम्बीनेशन एण्ड फ़ार्माकोलॉजिकल इफेक्ट्स बाइ एक्सपेरीमेंटल पेराप्यूटिक स्टडीज़	डॉ. सदफ जहान मेन्टर: डॉ वहाजुद्दीन	15.03.2016	14.03.2018
नॉड्युलेशन ऑफ सिस्टमिक इम्यून रिस्पॉस एण्ड पैथालॉजी इन DBA-1 माउस मॉडल रूमेटॉइड आर्थराइटिस बाइ *फ़ैसिओला जिजैन्टिक*-डिराइण्ड इम्यूनोमॉड्युलेटरी प्रोटीन्स (IMP)	डॉ यासिर खान मेन्टर: डॉ एन चट्टोपाध्याय	16.03.2016	15.03.2018
इनैन्शियोसेलेक्टिव ऑर्गेनोकैटालिसिस: ए नॉवेल ऐप्रोच टु यूज़ ऐसिटल ऐज़ प्रो-न्यूक्लियोफ़िल एण्ड हाईड्रोक्सीलैक्टम ऐज़ प्रो-इलेक्ट्रोफ़िल वाया को-ऑपरेटिव कैटलिसिज़	डॉ दीपांकर कोली	27.09.2016	26.09.2019
टार्गेटिंग द DnaG-Dnab इण्टरैक्शन इन मायोबैक्टीरियम ट्युबरकुलोसिस टु आइडेन्टीफ़ाइ एण्ड बैलिडेट सुटेबल स्मॉल मॉलीक्यूल इनहिबिटर्स	डॉ वाई के मंजू	28.09.2016	27.09.2019
ऐप्लिकेशन ऑफ़ कॉमन वेजिटेबल्स डेराइण्ड फ्लोरेसेंट कार्बन नैनोपार्टिकल्स इन *इन-वीवो* मल्टी ऐनालाइट सेन्सिंग	डॉ विक्रम सिंह मेन्टर: डा अतुल गोयल	11.08.2016	10.08.2018
डिसेक्टिंग द रोल ऑफ Drp1, aRint1 फैमिली प्रोटीन ड्यूरिंग DNA डैमेज रिस्पांस एण्ड इट्स इम्लिकेशन ऑन सेल साइकल चेक पांइट पाथवे इन फिज़न यीस्ट *एस प्रोम्बी*	डॉ शकील अहमद	30.09.0216	29.09.2019
ऐडिपोसाइ बायोलॉजी एण्ड इन्स्युलिन रेजिस्टेंस मेटावोलिक होम्योस्टैटिस यूजिंग नैचुरली ऑकरिंग बायो-एक्टिव/डायटरी लिपिड्स	डॉ अनिल एन गायकवाड़	27.09.2016	26.09.2019
आइसोलेशन, कैरेक्टराइज़ेशन ऑफ़ नॉवल एण्टी-मलेरियल कम्पाउण्ड्स फ्रॉम पोटेन्ट इण्डियन मेडिसिनल प्लान्ट्स चि बीइंग प्रैक्टिसाइज़्ड वाइ वेरिअस इंडियन ट्राइब्स अगेन्स्ट मलेरिया एण्ड इवैल्युएटिंग द एफीकेसी ऑफ़ देयर कॉम्बीनेशन अगेन्स्ट ड्रग रेजिस्टेंट *प्लाज़्मोडियम फ़ैल्सीपेरम* ऐज ऐन एक्सेलेन्ट आलटरनेटिव ड्रग	डॉ एम नागराजन मेंटर: डॉ संजीव के शुक्ला	01.09.2016	31.08.2018
सिथिसिज़ एण्ड कैरेक्टराइज़ेशन ऑफ हाइड्रोक्सीऐपाटाइट नैनो ड्रग वहीकल्स फॉर इफेक्टिव ड्रग डिलीवरी एण्ड देयर *इन विट्रो/इन वीवो* स्टडीज़ इन बोन	डॉ विजय कुमार मिश्रा मेंटर: डॉ ऋतु त्रिवेदी	14.07.2016	13.07.2018
क्वेस्ट फॉर ड्रगेबल टार्गेट्स अगेन्स्ट फ़ाइलेरियल मैनिफ़ेस्टेशन ऑफ ट्रॉपिकल पल्मोनरी इंयोसाइनोफ़ीलिया (TPE) : ए मॉस स्पेक्ट्रोमीट्री बेस्ड ग्लोबल प्रॉटियांम एनालिसिज़ ऑफ़ इयोसाइनोफ़ीलिया	डॉ मृगांक श्रीवास्तव	30.12.2016	29.12.2016
डिकार्बोक्ज़ाइलेटिव क्रॉस कपलिंग्स एन रूट टु द सिंथिसिज़ ऑफ़ हेट्रोसाइक्ल्स	डॉ संजय बत्रा	04.01.2017	03.01.2020
आइडेन्टीफिकेशन ऑफ़ शिकिमेट काइनेज़ ऐज़ ए ड्रग टार्गेट अगेन्स्ट *माइकोबैक्टीरियम ट्युबरकुलोसिस*	डॉ सपना पाण्डे मेंटर: डा के के श्रीवास्तव	16.01.2017	15.01.2020

शीर्षक	प्रधान अन्वेषक	प्रारंभ करने की तिथि	पूर्ण होने की संभावित तिथि
इण्डियन कांउसिल ऑफ़ मेडिकल रिसर्च			
डिज़ाइन सिंथिसिज़ एण्ड बायोलॉजिकल इवैल्युएशन ऑफ़ नॉवेल एजेण्ट्स फ़ॉर मैनेजमेण्ट्स डिज़ाइन प्रॉस्टैटिक हाइपरप्लेज़िया	डॉ वी एल शर्मा	01.12.2012	30.11.2015
इवैल्युएशन ऑफ़ प्लाइ-एडीपी-रिबोज़ पॉजीमरेज़-2(PARP-2) एण्ड कैसपेस-8 सिग्नलिंग मैकेनिज़म रोल ड्यूरिंग यूटरिन टिश्यू रिमॉडलिंग	डॉ राजेश कुमार झा	01.12.2012	30.11.2015
इवैल्यूएशन ऑफ़ रेस्क्यू ट्रीटमेन्ट फ़ॉर सेरेब्रल मलेरिया *इन विट्रो/इन वीवो* मॉडल	डॉ रेणु त्रिपाठी	21.11.2013	20.11.2016
डिज़ाइन सिन्थिसिज़, इवैल्युएशन एण्ड आइडेण्टीफ़िकेशन ऑफ़ नॉवेल ड्यूअली इफ़ेक्टिव स्पर्मिसाइडल एजेण्ट्स विद एण्टी ट्राइकोमोनल एक्टिविटी फ़ॉर प्रोफ़ाइलैक्टिक कॉन्ट्रासेप्शन	डॉ गोपाल गुप्ता	01.04.2014	31.03.2017
वैलिडेशन ऑफ़ डब्ल्यूएनटी पॉथवे माडुलेशन एण्ड एफ़िकेसी स्टडी इन प्राइमरी ओस्टियोपोरोसिस, फ्रैक्चर हीलिंग एण्ड सेकेण्डरी ओस्टियोपोरोसिस मॉडल्स फ़ॉर रिपोजिशनिंग ऑफ़ क्लोफ़ैज़िमिन	डॉ एन चट्टोपाध्याय	10.04.2014	31.03.2017
स्ट्डीज़ ऑन द इफ़ेक्ट्स ऑफ़ ओबिसोजन्स इन मेल जर्म सेल्स एन एक्सप्लोरेटरी स्ट्डी	डॉ डी पी मिश्रा	01.04.2014	31.03.2017
प्री-क्लीनिकल डिवेलपमेन्ट ऑफ़ केम्फ़ेरॉल विद इनहान्स्ड ड्रग डिलीवरी फ़ॉर सुपीरियर ओस्टियोजोनिक ऐक्टिविटी	डॉ रितु त्रिवेदी	01.04.2014	31.03.2017
लीड आइडेण्टीफ़िकेशन ऑफ़ नॉन स्टेरॉयडल मॉलीक्यूल विद ऐण्टी-प्रॉलीफ़रेटिव ऐक्टिविटी फ़ॉर मैनेजमेन्ट ऑफ़ इन्डोमीट्रियल हाइपरप्लेज़िया	डॉ अनिला द्विवेदी	01.04.2014	31.03.2017
प्री-क्लीनिकल डिवेलपमेन्ट ऑफ़ ओरली ऐक्टिव, रैपिड फ्रैक्चर हीलिंग एजेण्ट	डॉ दिव्या सिंह	15.06.2014	14.06.2017
स्टडीइंग मेकैनिज़म ऑफ़ प्रो-फ़र्टिलिटी एक्टिविटी ऑफ़ म्युकुमा प्युरिन्स, *विथेनिया सोमनीफ़ेरा* एण्ड *ऐस्पेरेगस रेसिमोसस* इन स्पर्मेटॉजेनिकली कॉम्प्रोमाइज़्ड रैट मॉडल एण्ड आइडेण्टीफ़िकेशन ऑफ़ एक्टिव फ़ाइटो-कॉन्स्टीट्युएन्ट्स	डॉ राजेन्दर सिंह	15.06.2014	14.06.2017
ज़ेनोबायोटिक्स एण्ड साइटोकाइंस मेटाबोलाइजिंग एन्जाइम्स जीन पॉली मॉर्फ़िज़्म्स इन ऐक्वायर्ड एप्लास्टिक ऐनीमिया	डॉ आर के त्रिपाठी	01.03.2015	28.02.2018
पृथ्वी विज्ञान मंत्रालय			
डिज़ाइन एण्ड सिन्थिसिज़ ऑफ़ नॉवेल डोलैस्टैटिन्स, एज़्यूमैमाइड्स एण्ड माइक्रोस्पोरिन ए एनालॉग्स : ए क्वेस्ट फ़ॉर एण्टी कैन्सर ड्रग्स	डॉ दीपांकर कोली	01.11.2012	31.03.2015
बायोलॉजिकल इवैल्युशन, डिस्कवरी, ऑफ़ नॉवेल बायोऐक्टिव कम्पाउण्ड्स एण्ड कोआर्डिनेशन ऑफ़ द MoES प्रोजेक्ट ड्रग फ्रॉम सी	डॉ पी के शुक्ला	01.11.2012	31.03.2017
डिवेलपमेन्ट ऑफ़ एण्टीमाइक्रोबियल, एण्टीइन्फ्लमेटरी एण्ड एण्टीकैंसर एजेण्ट्स फ्रॉम द मैरिन ऑर्गेनिज़्म्स एण्ड माइक्रो ऑर्गेनिज़्म्स	डॉ टी नरेन्दर	01.08.2013	31.07.2016
सर्च फ़ॉर नॉवेल एण्टीमाइक्रोबियल एण्ड एण्टीकैन्सर मेटाबोलाइट्स फ्रॉम मैरिन बैक्टीरिया	डॉ प्रेम प्रकाश यादव	01.08.2013	31.12.2016
सिंथेसिस एण्ड बायोइवेल्युएशन ऑफ केमिकल लाईबेरी बी-कार्बोलेन बेस्ड मिमिक्स ऑफ मेरीन नेचुरल प्रोडक्ट्स	डॉ संजय बत्रा	20.04.2015	19.04.2018
सिंथेसिस ऑफ फासकेप्लाइसिन एनालॉग्स एज पॉसिबल एन्टी कैंसर एजेन्टस	डॉ एम एस रेड्डी	20.04.2015	19.04.2018
कलेक्शन एण्ड फ्रेक्शनेशन ऑफ द आईडेन्टिफाइड लीड्स सच एस NIO-905-8002(F003,4) एण्ड NIO-968 (CNS) NIO-970	डॉ मधु दीक्षित	20.08.2015	19.08.2017
थर्ड पार्टी वेरिफिकेशन एण्ड आउटसोर्सिंग ऑफ सम आफ द एक्टीविटीज़ रिलेटड टू डेवलपमेंन्ट ऑफ ड्रग्स फ्राम ओशिएन	डॉ मधु दीक्षित	08.12.2015	07.12.2017
लिगैन्ड एण्ड स्ट्रक्चर बेस्ड स्क्रीनिंग ऑफ़ डिजाइन्ड एण्ड सिन्थेसाइज़्ड केमिकल लाइब्रेरी एराउण्ड सैमैपलिन A अगेन्स्ट DNA मिथाइलट्रान्सफ़रेज 1 (DNMT1) एण्ड डाइवर्सिटी ओरिएन्टेड सिन्थिसिज़ ऑफ पेकेट्रिसामीन ऐज़ एण्टी कैंसर एजेण्ट्स	डॉ गौतम पाँडा	01.02.2016	31.01.2019

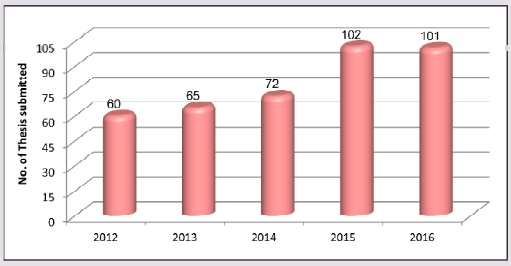
शीर्षक	प्रधान अन्वेषक	प्रारंभ करने की तिथि	पूर्ण होने की संभावित तिथि
इण्डियन नैशनल साइंस एकैडमी			
होलिस्टिक एपिजिनोम एनालिसिज़ टु आइडेण्टीफ़ाइ डिफ़रेन्शियली मिथाइलेटेड रीजन्स (DMRs) दैट अफ़ेक्ट मेल फ़र्टिलिटी	डॉ राजेन्दर सिंह	01.04.2014	31.03.2017
एटिन्युएशन ऑफ़ जीसीएसएफआर सिग्नलिंग बाइ यूबिक्विटिनेशनः इम्प्लिकेशन्स ऑफ़ E3 यूबिक्विटिन लाइगेसेज इन जीसीएसएफ़आर सिग्नलिंग मीडिएटेड माइलॉइड ल्यूकीमिया पैथॉजेनेसिस	डॉ अरुण कुमार त्रिवेदी	01.07.2014	30.06.2017
अण्डरस्टैडिंग द रोल ऑफ़ हीट शॉक प्रोटीन्स (HSP3) इन *प्लाज़्मोडियम फ़ैल्सीपैरम* सर्वाइवल इन स्ट्रैस कण्डीशन्स	डॉ नीति कुमार	01.01.2015	31.12.2017
डिसिफ़रिंग द रोल ऑफ़ SOCS प्रोटीन्स इन रेगुलेटिंग प्रो/एण्टी-इन्फ़्लमेटरी रिस्पॉस ड्यूरिंग एक्सपेरीमेन्टल विसरल लीशमैनियासिस	डॉ सुशान्त कार	01.03.2016	28.02.2019
(i) वैक्सीन डेवलपमेंट अगेन्स्ट बिसरल लीशमैनियासिस (ii) स्टडीज़ टु इन्वेस्टीगेट द मॉड्लेशन ऑफ़ Th 17 पाथवेज इन टस इन रिलेशन टफ पोटेंशियल वैक्सीन (iii) डेवलपमेंट ऑफ़ ए न्यू टेस्ट मॉडल फ़ॉर रैपिड स्क्रीनिंग ऑफ़ एण्टीलीशमैनियल्स	डॉ अनुराधा दुबे	01.04.2016	31.03.2021
डिफेन्स रिसर्च एण्ड डेवलपमेन्ट आर्गेनाइजेशन			
फार्मेकोकायनेटिक स्टडीज़ ऑफ रेडियोप्रोटेक्टिव फार्मुलेशन्स प्रिपेयर्ड फ्राम एक्टिव प्रिंसिपल आइसोलेट्स फ्राम *पोडोफ़ाइलम हैक्जेन्ड्रम*	डॉ आर एस भट्टा	07.05.2015	06.05.2016
डेवलेप्मेंट ऑफ़ प्री क्लीनिकल एण्ड क्लीनिकल रेडियोप्रोटेक्टिव फार्मुलेशन प्रिपेर्ड बाइ कम्बाइनिंग प्रोडोफ़ाइलोटॉक्सिन एण्ड रूटिन	डॉ आर एस भट्टा	13.10.2016	12.10.2017
सीएसआईआर यंग साइंटिस्ट अवार्ड			
आइडेन्टीफ़िकेशन ऑफ़ काइनेज़ एण्ड फ़ॉस्फ़टेज़ स्पेसिफ़िक टु CTD स्टीन 7 ऑफ़ RNA पॉलीमरेज ।।	डॉ सोहेल अख्तर	01.05.2011	30.04.2016
इल्युसिडेशन ऑफ फंक्शनल इनैक्टिवेशन ऑफ़ cdx2 एक्सप्रेशन इन कोलन कैंसर सेल्स : पॉसिबल रोल ऑफ़ E3 यूबिक्विटिन लिगेसेज़ इन रेगुलेटिंग स्टेडी स्टेट लेविल्स ऑफ cdx2 प्रोटीन एक्सप्रेशन वाया यूबिक्विटिनेशन	डॉ ए के त्रिवेदी	01.04.2014	31.03.2019
जे सी बोस फेलोशिप			
मॉलीक्युलर स्टडीज़ टु डिलिनिएट द रोल ऑफ़ नाइट्रिक ऑक्साइड/नाइट्रिक ऑक्साइड सिन्थेज़ इन न्यूट्रोफ़िल मैच्योरेशन, सर्वाइवल एण्ड फंक्शंस	डॉ मधु दीक्षित	24.02.2016	30.11.2017
(i) वैक्सीन डेवलपमेंट अगेन्स्ट बिसरल लीशमैनियासिस (ii) स्टडीज़ टु इन्वेस्टीगेट द मॉड्लेशन ऑफ़ Th 17 पाथवेज इन टस इन रिलेशन टफ पोटेंशियल वैक्सीन (iii) डेवलपमेंट ऑफ़ ए न्यू टेस्ट मॉडल फ़ॉर रैपिड स्क्रीनिंग ऑफ़ एण्टीलीशमैनियल्स (iv) अण्डरस्टैंडिंग ऑफ़ ड्रग रेज़िस्टेन्स मेकैनिज़्म (v) ऐण्टीलीशमैनियल ड्रग डिस्कवरी एण्ड ऑगमेंटेशन इन ड्रग एफ़ीकेसी बाइ इम्यूनोमॉडुलेशन एण्ड डिलीवरी एप्रोच	डॉ अनुराधा दुबे	09.08.2016	08.05.2019
सीएसआईआर – प्रतिष्ठित वैज्ञानिक			
इन्टीग्रेटेड 3डी मॉलीक्युलर मॉडलिंग, डिज़ाइन एण्ड सिन्थिसिज़ ऑफ़ नॉवेल केमिकल एन्टिटीज़ (NCEs) एज़ पोटेन्शियल एजेण्ट्स फ़ॉर द ट्रीटमेन्ट ऑफ़ अल्ज़ाइमर डिज़ीज़	डॉ ए के सक्सेना	01.05.2014	30.04.2017
स्टैन्डर्डाइज्ड फ़ाइटोफार्मास्युटिकल्स फॉर द प्रिवेंशन एण्ड ट्रीटमेंट ऑफ़ द बोन रिलेटेड डिस्आर्डर्स एण्ड कार्डियोवैस्कुलर हेल्थ : एण्ड टु एण्ड प्री क्लीनिकल डेवलेपमेंट	डॉ राकेश मौर्या	06.01.2017	05.01.2020
डिपार्टमेन्ट ऑफ एटॉमिक एनर्जी			
डिजाइन एण्ड सिंथेसिस ऑफ डोनर-एक्सेप्टर बेस्ड न्यू आर्गेनिक फ्लोरेसेंट डाइज एण्ड देयर एप्लीकेशन्स	डॉ अतुल गोयल	06.01.2016	05.01.2021
एनएमआईटीएलआई			
नॉवेल DPP IV इनहिबिटर न्फेज़ I/II स्टडी : ए सेफ़्टी फ़ार्माकोकाइनेटिक एण्ड फ़ार्माकोडायनमिक स्टडी ऑफ़ CPL-2009-0031 इन हेल्दी वॉलन्टियर्स एण्ड पेशेन्ट्स विद टाइप 2 डायबिटीज़ मेलिटस (T2DM)	डॉ एस के रथ	01.04.2016	31.03.2019
आयुष			
एक्सप्लोरेशन, आइडेण्टीफ़िकेशन एण्ड आइसोलेशन ऑफ़ बोन फ्रैक्चर हीलिंग एजेण्ट्स फ्रॉम इण्डियन ट्रेडीशनल प्लाण्ट्स *फोलिडोटा आर्टीकुलेट* एण्ड *सोलोज़िन क्रिस्टेटा* (ऑर्किडेसी)	डॉ के आर आर्या	31.1.22014	31.12.2017

4. प्रायोजित परियोजनाएं

परियोजना शीर्षक	निधि प्रदाता एजेन्सी	प्रधान अन्वेषक	प्रारम्भ की तिथि	पूर्ण होने की अनुमानित तिथि
लाइसेन्सिंग ऐग्रीमेन्ट ऑफ़ प्लांट एक्सट्रैक्ट A-4744	फार्मेन्ज़ा हर्बल प्राइवेट लि., गुजरात	डॉ एन चट्टोपाध्याय	01.04.2016	31.03.2017
सिन्थेटिक माइक्रोबिसाइडल वैजाइनल स्थर्मिसाइड्स : डिजाइन, सिंथिसिज़ एण्ड बायोलॉजिकल इवैल्युएशन	एच एल एल तिरूवनन्तपुरम्	डॉ गोपाल गुप्ता	22.06.2015	21.06.2018
टॉक्सीकोलॉजी स्टडी ऑफ़ RISUG इम्प्लांटेड इन द यूटरस ऑफ़ रैट्स	आई आई टी खड़्गपुर	डॉ आर के सिंह	25.05.2016	24.05.2018
इन विट्रो स्क्रीनिंग ऑफ ARP कम्पाउण्ड्स	एडवान्स रिसर्च प्रोडक्ट्स, पैटरसन, एन जे, यू एस ए	डॉ कुमकुम श्रीवास्तव डॉ सतीश मिश्रा	24.05.2016	23.05.2018
एन एन आर स्पेक्ट्रॉस्कोपिक कैरेक्टराइज़ेशन ऑफ़ INTAS DP	INTAS फ़ार्मास्युटिकल्स लिमिटेड, अहमदाबाद	डॉ आशीष अरोड़ा	29.07.2016	28.07.2017

5. कन्सल्टेंसी परियोजनाएं

परियोजना शीर्षक	निधि प्रदाता एजेन्सी	प्रधान अन्वेषक	प्रारम्भ की तिथि	पूर्ण होने की अनुमानित तिथि
टीईएम/डीएलएस एनालिसिज़ ऑफ़ लिपोज़ोम्स/वैसिकल्स	गैलेक्सी सर्फ़ेक्टेन्ट्स, नवी मुम्बई	डॉ मनीष चौरसिया	15.03.2016	14.03.2017
बोन बायोलॉजी एनक्लूडिंग ओस्टियोपोरोसिस कवरिंग द पैथालॉजी, ऐनिकल मॉडल, क्लीनिकल एण्ड प्रोक्लीनिकल एण्ड पाइंट्स एण्ड ट्रीटमेन्ट्स	GSKCH, गुड़गाँव	डॉ एन चट्टोपाध्याय	04.04.2016	03.04.2017



मानव संसाधन विकास

1. प्रस्तुत शोध प्रबंध

क्रम सं.	छात्र का नाम	शीर्षक	वैज्ञानिक का नाम
	जवाहर लाल नेहरू विश्वविद्यालय, नई दिल्ली		
1.	चन्दन कुमार मौर्य	रोल ऑफ़ इनेट इम्यून कॉम्पोनेन्ट्स इन इनफ्लमेशन इनड्यूज्ड इन्स्युलिन रेज़िस्टेन्स	डॉ अखिलेश के ताम्रकार
2.	रेशू स्कसेना	मॉड्युलेशन ऑफ़ कैंडीडेट यूकेरॉयटिक सेल प्रोटीन एक्सप्रेशन मीडिएटेड बाई HIV-1 Nef	डॉ आर के त्रिपाठी
3.	अमित कुमार सोनकर	आइडेंटीफिकेशन ऐण्ड बायोकेमिकल कैरेकटराइज़ेशन ऑफ़ Rna14 ऐण्ड इट्स इण्टरैक्टिंग पार्टनर्स इन फिशन *थीस्टशाइज़ोसैक्रो माइसेज़*	डॉ शकील अहमद
4.	एन तिरूपति	सिंचिसिज ऑफ़ मेडिसिनली इंट्रेस्टिंग हेट्रोसाइकल्स वाया इलेक्ट्रोफिलिक साइक्लिज़ेशन ऑफ़ अल्काइनॉल्स ऐण्ड अलकाइनैमाइन्स	डॉ एम एस रेड्डी
5.	पुनीत कुमार गुप्ता	सिंथिसिज़ ऑफ़ बायोऐक्टिव हेट्रोसाइकल्स ऐज़ एस्ट्रोजन रिसेप्टर मॉड्युलेटर्स	डॉ कंचन हजेला
6.	श्री कान्त शर्मा	कनफ़र्मेशनल स्टडीज़ ऑफ़ साइक्लिक पेप्टाइड्स विद $\alpha_3\beta3\gamma$ आर्किटेक्चर ऐण्ड स्ट्रक्चरल एनालिसिज़ ऑफ़ SIX3-प्रोटीन ऐण्ड इट्स म्यूटेन्ट्स इनवॉल्व्ड इन हॉलोप्रॉसेनसिफ़ैली	डॉ रविशंकर अम्पापति
7.	रूबी गोयल	ए कम्पैरेटिव स्टडी ऑन द सेन्ट्रल रेनिन ऐन्जियोटेन्जिन सिस्टम इन LPS इन्ड्यूज्ड न्यूरोइन्फ़्लमेशन ऐण्ड मेमोरी इम्पेयरमेन्ट इन नॉर्मोटेन्सिव ऐण्ड हाइपर टेन्सिव रैट्स	डॉ राकेश शुक्ला
8.	मनीषा यादव	री-पर्पज़िंग ऑफ़ FDA ऐप्रूव्ड ड्रग्स टुवर्ड्स ऐण्टी कैन्सर ऐक्टिविटीज ऐण्ड डिटेल्ड मेकैनिप्टिक इल्यूसिडेशन ऑफ़ ऐन ऐण्टी-कैंसर कम्पाउंड विद ऐरिल नैथिल स्कफ़ल्ड	डॉ सव्यसाची सान्याल
9.	किरन कुमार यल्ला	सिंथिसिज़ ऑफ़ वेरिअस टेट्रोसाइकल्स वाया इलेक्ट्रोफ़िलिक साइक्लिज़ेशन ऑफ अलकाइनॉल्स ऐण्ड अल्काइनैमाइन्स ऐण्ड सिंथिसिज़ ऑफ़ मेडिसिनली इम्पॉर्टेन्ट साइक्लिक /एसाइक्लिक स्कफ़ल्ड	डॉ एम एस रेड्डी
10.	देवी रेड्डी आनन्द	सिन्थिसिज़ ऑफ़ नॉवेल छ.हेट्रोसाइक्लिक कम्पाउंड्स ऐज बायोऐक्टिव एजेण्ट्स	डॉ पी.पी. यादव
11.	पंचम सिंह कांडियाल	डिजाइन, कन्फ़र्मेशनल स्टडीज़ ऑफ़ पेप्टीडोमाइमेटिक्स कन्टेनिंग लीनियर ऐण्ड साइक्लिक शुगर ऐमिनो ऐसिड (SAA), β-होमोप्रोलीन ऐण्ड स्टडीज़ इन्वॉल्विंग β–पेप्टाइड्स ऐज़ इनहिबिटर्स फ़ॉर प्रोटीन-प्रोटीन इन्टरैक्शन	डॉ रविशंकर अम्पापति
12.	विशाल श्रीवास्तव	प्रोटियोम एनालिसिज़ ऑफ़ माइकोबैक्टीरियल सिग्मा फ़ैक्टर, Sig F म्यूटेन्ट्स	डॉ बी.एन. सिंह
13.	विकास शर्मा	एपिजेनेटिक रेगुलेशन ऑफ़ स्टेरॉयड रिसेप्टर्स इन प्रॉस्टेट कैन्सर सेल्स बाइ डायटरी ऐण्ड सिंथेटिक कंपाउंड्स	डॉ गोपाल गुप्ता
14.	केदुर्गाराव विश्वनादम	डिज़ाइन, सिंथिसिज़ ऐण्ड बायोलॉजिकल इवैल्युएशन ऑफ़ लिपिडेटेड स्कॉल मॉलीक्यूल्स ऐज ए टार्गेटेड ऐण्टी कैन्सर एजेन्ट्स	डॉ मनीष चौरसिया
15.	राम कृष्ण के कुमार जी	सिथिसिज़ ऑफ़ ग्लाइकोहाइब्रिड्स ऐण्ड देयर बायोलॉजिकल ऐक्टिविटीज़	डॉ आर.पी. त्रिपाठी
16.	सोनल श्री	स्ट्रक्चरल ऐण्ड फ़ंक्शनल स्टडीज़ ऑन ACT/RAM डोमेन कन्टेनिंग प्रोटीन्स फ़्रॉम माइकोबैक्टीरिया	डॉ आर. रविशंकर
17.	रिज़वानुल हक	आइडेन्टीफ़िकेशन एण्ड मॉलीक्युलर कैरेक्टराज़ेशन ऑफ़ जेनेटिक मॉड्युलेटर्स एसोसिएटेड विद न्यूरोडिजेनरेटिव डिज़ीज़ : स्टडीज़ एम्प्लॉइंग ट्रान्सजेनिक C. एलेगैनस मॉडल	डॉ आमिर नाज़िर
18.	अशोक रंजन नायक	स्ट्रक्चर फंक्शन स्टडीज़ ऑन सेलेक्टेड प्रोटीन्स ऑफ़ यूनीक मेटाबोलिक इन्पॉर्टेन्स फ़्रॉम ह्यूमन पैथॉजन्स	डॉ जे वी प्रताप
19.	करन सिंह सैनी	इन्वेस्टीगेशन्स इनटु द क्रॉस टॉक बिटवीन ऐण्ड्रोजन ऐण्ड साइटोकाइन सिगनलिंग पाथवेज़ इन ब्रेस्ट कैंसर	डॉ ऋतुराज कोनवर
20.	ई रामकृष्ण	फ़ाइटोकेमिकल इन्वेस्टीगेशन ऑफ़ इण्डियन मेडिसिनल प्लाण्ट इन सर्च ऑफ़ ऐण्टी डायविटिक ऐण्ड ऐण्टी ओस्टियोपोरोटिक कंपाउंड ऐण्ड केमिकल ट्रान्सफ़ॉर्मेशन ऑफ़ बायोऐक्टिव मॉलीक्यूल्स	डॉ राकेश मौर्या
21.	समृद्धि शुक्ला	आइडेन्टिफ़िकेशन ऑफ़ एपिजेनेटिक माड्युलेटरी फाइटोकेमिकल्स ऐण्ड देयर मोड्स ऑफ़ ऐक्शन इन नॉन स्मॉल सेल लंग कैन्सर	डॉ सैयद-मुस्तफ़ा एम
22.	साजिद खान	इन्वेस्टीजेटिंग द रोल ऑफ़ एपिथेलियल-टु मेसेनचाइमल ट्रानज़िशन इन ब्रेस्ट कैन्सर मेटास्टैटिस : पॉसिबल थेराप्यूटिक इण्टरवेंशन्स	डॉ सैयद मुस्तफा एम
23.	धन राजु मण्डलपु	डिज़ाइन सिथिसिज़ ऐण्ड बायोलॉलिकल प्रोफ़ाइलिंग ऑफ़ नॉवेल सिंथेटिक एजेण्ट्स फ़ॉर द मैनेजमेन्ट ऑफ़ कॉन्ट्रासेप्शन ऐण्ड कैंसर	डॉ वी एल शर्मा
24.	ऋचा सक्सेना	स्टडीज़ ऑन द आइडेन्टीफ़िकेशन ऐण्ड कॉन्ट्रीब्यूशन ऑफ़ मैक्रोफेज प्रोटीन्स ड्यूरिंग इन्ट्रासेल्युलर एक्सप्रेशन ऑफ़ माइकोबैक्टीरियल साइटोसोलिक काइनेज : मैनीफ़ेस्टेशन ऑफ़ द रोल इन माइकोबैक्टीरियल पर्सिस्टेन्स इन मैक्रोफेज	डॉ किशोर के श्रीवास्तव
25.	शाहिदा ओकर	डाइबर्सिटी ओरियंटेड सिंथिसिज़ ऑफ़ फ्लोरेसेन्ट ऐरोमैटिक/हेट्रोसाइक्लिक स्कफ़ल्ड्स फ़ॉर बोयालॉलिकल एण्ड केमोसेन्सिंग ऐप्लिकेशन्स	डॉ अतुल गोयल
26.	मुक्तानंद त्रिपाठी	एक्सप्लोरेशन ऑफ द फ़ंक्शनल सिग्नीफ़िकेन्स ऑफ फ्रक्टोज़ बायोसिन्थिज़ (polyol) पाथवे इन मेल रिप्रोडक्टिव सिस्टम	डॉ राजेन्दर सिंह
27.	सुमित जोशी	आइडेन्टीफ़िकेशन ऐण्ड सिंथिसिज़ ऑफ़ ऐण्टीजेनिक एपिटोपस ऑफ़ *एल डोनोवनी* Th1 सिस्टम्युलेटरी प्रोटीन्स फ़ॉर द डिवेलपमेन्ट ऑफ़ सिंथेटिक वैक्सीन अगेन्स्ट विसरल लीशमैनियासिस	डॉ अनुराधा दुबे

28.	निशान्त सिंह	डिज़ाइन, सिथिसिज़ ऐण्ड बायोलॉजिकल इवैल्युएशन ऑफ़ शुगर ऐमिनो ऐसिड बेस्ड ग्लाइकोपेप्टाइड मिमिक्स एण्ड टोटल सिथिसिज़ ऑफ़ बायोऐक्टिव नैचरल प्रॉडक्ट्स	डॉ दीपांकर कोली
29.	लोकेश कुमार	प्री एण्ड पोस्ट इजेकुलेटरी ईबेन्ट्स गवर्निंग स्पर्म फ़र्टिलिटीः नॉवेल टार्गेट्स फ़ॉर कॉन्ट्रासेप्टिव इण्टरवेन्शन	डॉ गोपाल गुप्ता
30.	नेहा सिंह	आइडेन्टीफ़िकेशन ऑफ द रोल ऑफ़ सिटीन 7 फॉस्फोरिलेशन इन उत्क। ट्रान्सक्रिप्शन	डॉ सोहेल अख्तर
31.	शिवानी दीक्षित	इवैल्युएशन ऑफ़ थेराप्यूटिक एफ़िकेसी ऑफ विटामिन डी और इट्स ऐनालॉग्स एलोन ऑर इन कॉम्बीनेशन विद फ़ाइटोकेमिकल्स इन कैन्सर	डॉ ऋतुराज कोनवर
32.	वी निरंजन कुमार	कैरेक्टराइजेशन ऑफ़ पैराफ्लैगरर रॉड असेम्बली इन लीशमैनिया	डॉ अमोल ए सहस्रबुद्धे
33.	मो. हमीम	द रोल ऑफ़ ह्यूमन डीएनए लिगेस 1 इन डीएनए रेप्लिकेशन	डॉ दिब्येन्दु बनर्जी
34.	हिमांशु पाँडे	बायोफ़िजिकल एण्ड इम्यूनोलॉजिकल कैरेक्टराइज़ेशन ऑफ़ सेलेक्टेड प्रोटीन्स ऑफ़ ESAT-6 फैमिली फ्रॉम माइकोबैक्टीरियम ट्युबरकुलोसिस H37Rv	डॉ आशीष अरोड़ा
35.	क्याथम श्रीनिवास	टोटल सिंथेसिस एण्ड बोलॉजिकल इवैल्युएशन ऑफ़ बायोऐक्टिव आइज़िडाइन अल्कलॉइड्स, साइक्लिक पेप्टाइड्स ऐण्ड देयर डेरीवटिव्स	डॉ दीपांकर कोली
36.	समा अजय	स्टडीज़ ऑन स्टीरियो सेलेक्टिव सिंथिसिंज़ ऑफ़ साइटोटॉक्सिक मॉलीक्यूल्स	डॉ अरून के शॉ
37.	अमित कुमार सिंह	फंक्शनल एनालिसिस ऑफ़ एपिजेनेटिक मॉडीफिकेशन्स एण्ड इण्टरैक्शन्स ऑफ़ द कार्बोक्ज़ाइ-टर्मिनल डोमेन ऑफ़ RNA पॉलीमरेज II	डॉ सोहेल अख्तर
38.	शिवांगी रस्तोगी	आइडेन्टीफ़िकेशन ऐण्डकैरेक्टराइज़ेशन ऑफ़ एन्ज़ाइम्स इनवॉल्व्ड इन फैटी ऐसिड यूटिलाइज़ेशन बाइ माइकोबैक्टीरियम ट्युबरकुलोसिस ड्यूरिंग डॉर्मेन्सी	डॉ वाई के मन्जू
39.	आशीष काबरा	स्ट्रक्चरल कैरेक्टराइज़ेशन ऑफ़ प्रोटीन्स इनवॉल्व्ड इन ट्रान्सलेशन फ्रॉम वॉलबैशिया एण्डोसिम्बॉएन्ट स्ट्रेन TRS ऑफ़ *ब्रूजिया मलाइ* ऐण्ड विब्रियो कॉलरा पेप्टाइडिल-tRNA हाइड्रोलेज़	डॉ आशीष अरोड़ा
40.	तरूण कुमार बारभूयन	इवैल्युएशन ऑफ़ बोन क्वालिटी ऐण्ड बायोमैटीरियल कॉम्पोज़ीशन अण्डर फिजियोलॉजिकल ऐण्ड पैथॉफ़िज़ियोलॉजिकल कन्डीशन्स ऐण्ड फार्माकोलॉजिकल इण्टरवेन्शन्स	डॉ नैबेध चट्टोपाध्याय
41.	विकाश कुमार	कम्प्यूटेशनल स्टडीज़ ऑन प्रोटीन टार्गेट्स इनवॉल्व्ड इन कैन्सर एण्ड *इन सिलिको* आइडेन्टीफ़िकेशन ऑफ़ पोटेन्शियल ऐण्टी कैन्सर एजेण्ट्स	डॉ मो. इमरान सिद्दीकी
42.	कुमार सचिन सिंह	कैरेक्टराइज़ेशन ऑफ़ सेलेक्टेड जीन्स ऑफ ग्लिसिन मेटाबोलिक पाथवे एण्ड देयर रोल इन माइकोबैक्टीरियल सवाईइवल	डॉ सुधीर के सिंह
43.	आशुतोष पति त्रिपाठी	रोल ऑफ़ होस्ट miRNA इन सर्वाइवल ऑफ़ माइकोबैक्टीरियम इन मैक्रोफ़ेजेज़	डॉ बी एन सिंह
44.	अंशिका टण्डन	स्टडीज़ ऑन द कैरेक्टराइज़ेशन ऑफ़ स्ट्रक्चरल, फंक्शनल एण्ड बायोलॉजिकल प्रापर्टीज़ ऑफ़ स्मॉल पेप्टाइड्स डिराइण्ड फ्रॉम प्रोटीन्स ऑफ LPS रिकगनिशन मशीनरी ऑर ऐनालॉग्स ऑफ़ नैचरली ऑकरिंग एण्टी माइक्रोवियल पेप्टाइड्स	डॉ जीमुत कान्ति घोष
45.	एम ज़ाकिर हुसैन	डिवेलपमेन्ट ऐण्ड इल्यूसिडेशन ऑफ़ मेकैनिज़म ऑफ़ ऐक्शन ऑफ़ पैंक्रियाज़ैटिन इनहिबिटर्स टु कन्ट्रोल डायबिटीज़	डॉ जे आर गाइन
46.	कृपा शंकर	क्रोनिक हाइपर इन्स्युलिनेमिया ऐण्ड हाई फैट डाइट इन द डिवेलपमेन्ट ऑफ़ इन्स्युलिन रेज़िस्टेन्स : कम्पैरेटिव मेटाबोलिक प्रोफ़ाइलिंग ऐण्ड नॉवेल थेराप्यूटिक इण्टरवेन्शन्स	डॉ अनिल एन गायकवाड़
47.	सुधीर कुमार	आइसोलेशन ऐण्ड कैरेक्टराइज़ेशन ऑफ नैचरल प्रॉडक्ट्स फ़ॉर बायोइवैल्युएशन एण्ड केमिकल ट्रान्सफ़ॉर्मेशन ऑफ बायोऐक्टिव कंपाउंड्स	डॉ राकेश मौर्या
48.	दिघे शशिकान्त उत्तम	कैसकेड स्ट्रैटजीज़ फ़ॉर द सिंथिसिज़ ऑफ फ्यूज्ड-नाइट्रोजन टेट्रोसाइकल्स ऐण्ड β–कार्बोलिन बेस्ड नैचरल प्रॉडक्ट्स	डॉ संजय बत्रा
49.	मंजीत कुमार	आइडेन्टीफ़िकेशन ऑफ़ नॉवेल Nef इण्टरैक्टिंग प्रोटीन इन सी. एलेगैन्स ऐण्ड देयर फक्शनल रोल इन ह्यूमन	डॉ राजकमल त्रिपाठी
50.	एल रवितेज सिंह	एक्सप्लोरिंग द फंक्शनल डाइवर्सिटी ऑफ़ 4 हाइड्रोक्ज़ाइ अलकाइलआइसोथैलडिहाइड फ़ॉर द सिंथिसिज़ ऑफ़ मेडिसिनली इम्पॉर्टेन्ट स्मॉल मॉलीक्यूल लाइब्रेरीज़	डॉ के वी शशिधरा
51.	पंकज शर्मा	प्रोटियोम एनालिसिज़ ऑफ़ म्यूरिन लंग एक्ज़िबिटिंग फ़ाइलेरियल मैनिफ़ेस्टेशन्स ऑफ़ ट्रॉपिकल पल्मोनरी इयोसाइनोफीलिया	डॉ मृगांक श्रीवास्तव
52.	अमित कुमार त्रिपाठी	कैरेक्टराइज़ेशन ऑफ़ एण्टी माइक्रोबियल, साइटोटॉक्सिक एण्ड एण्टी-इन्डोटॉक्सिन प्रॉपर्टीज ऑफ़ डिज़ाइनर पेप्टाइड्स एण्ड पेप्टाइड्स ऑफ़ नैचरल ओरिजिन	डॉ जीमुत कान्ति घोष
53.	मनोज कथूरिया	स्टडीज़ ऑन द मोड ऑफ़ ऐक्शन ऑफ़ प्रॉमिसिंग एण्टी लीशमैनियल एजेण्ट्स	डॉ कल्याण मित्रा
54.	राघवेन्द्र मुरूगुला	डिज़ाइन एण्ड सिंथिसिज़ ऑफ़ नॉवेल पेप्टिडॉमिमेटिक्स ऑफ़ बायोलाजिकल इन्ट्रेस्ट	डॉ डब्लू हक
55.	कपिल उपाध्याय	सिथिसिज़ ऑफ़ ग्लाइकोहाइब्रिड मॉलीक्यूल्स ऐज़ न्यू केमोथेराप्यूटिक एजेण्ट्स	डॉ आर पी त्रिपाठी
56.	गौरव कुमार सिंह	इफ़ेक्ट ऑफ सी-टर्मिनस ट्रंकेशन ऑफ़ Mad2 ऑन मिटोटिकस्पिंडल चेक पाइंट इन फ़िज़न यीस्ट शाइज़ोसैक्रोमाइसेज पॉम्बे	डॉ शकील अहमद
57.	रवि ठाकुर	स्टडीज़ ऑन द मॉलीक्युलर इंस्टिंक्ट्स एण्ड माइक्रोएनवायरनमेन्टल इन्स्टीगेशन इन कैन्सर	डॉ डी पी मिश्रा
58.	रोहित महर	एनएमआर बेस्ड मेटाबोलिक प्रोफ़ाइलिंग ऑफ़ टार्गेटेड सेकेण्डरी मेटाबोलाइट्स इन सेलेक्टेड ऐण्टीकैन्सर प्लाण्ट्स	डॉ संजीव के शुक्ला
59.	एन देबेन्दर	सिंथेटिक स्टडीज़ ऑन ब्यूटेनोलाइड्स ऐण्ड ऐमिनो अल्कोहल डेरीवटिव्स ऐज़ केमोथेराप्यूटिक एजेण्ट्स	डॉ आर पी त्रिपाठी

60.	चडचन संगप्पा वसन्ना	डिटर्मिनेशन द रोल ऑफ़ एन्डोग्लिनसिगनलिंग इन यूटरिन रिसेप्टिविटी फॉर द एम्ब्रयो इम्प्लाण्टेशन	डॉ राजेश कुमार झा
61.	मनीषा दीक्षित	इन्वेस्टीगेशन ऑफ द इफ़ेक्ट्स ऑफ मेडीकार्पिन ऐण्ड रिलेटेड टेरोकार्पन्स ऑन फ्रैक्चर हीलिंग इन रैट्स	डॉ दिव्या सिंह
62.	अरिन्दम भट्टाचार्या	मेकैनिस्टिक ऐसपेक्ट्स ऑफ़ सेल डेथ इनड्यूज़्ड बाइ एण्टी-नियोप्लास्टिक एजेण्ट्स इन ह्यूमन कैन्सर सेल लाइन्स	डॉ कल्याण मित्रा
63.	अनूप कुमार सिंह	मॉलीक्युलर कैरेक्टराइज़ेशन ऐण्ड टार्गेटिंग ऑफ़ कैन्सर स्टेम सेल्स (CSCS): डिसिफ़रिंग द सेल्युलर मेकैनिज़्म ऑफ़ ऐक्शन ऑफ़ सीएससी स्पेसिफ़िक केमोथेराप्यूटिक एजेण्ट्स	डॉ दीपक दत्ता
64.	समन खान	अंडरस्टैंडिंग द रोल ऑफ हेट्रोक्रोमैटिन डिफेक्टिव म्यूटेन्ट्स ऑन रेप्लिकेशन फॉर्क स्टैबिलिटी ऐण्ड चेकपॉइंट कन्ट्रोल इन फ़िज़न यीस्ट शाइज़ोसैकरोमाइसेज़ *पॉम्बे*	डॉ शकील अहमद
65.	जॉयश्री बिस्वास	टु इन्वेस्टीगेट द रोल ऑफ़ ऐस्ट्रोसाइट्स, माइटोकॉन्ड्रियल फ़ंक्शन, ग्लूकोज़ ट्रान्सपोर्ट ऐण्ड न्यूरॉनल डेथ मेकैनिज़्म इन अल्ज़ाइमर्स पैथॉलॉजीः ए स्टडी इन स्ट्रेपटोज़ॉटोसिन इनड्यूज़्ड एक्सपेरीमेन्टल मॉडल	डॉ सारिका
66.	निधि	कम्प्यूटेशनल स्टडीज़ ऑन प्रोटीन टार्गेट्स इनवॉल्व्ड इन इनफ़ेक्शस डिज़ीज़ेज ऐण्ड इन सिलिको आइडेन्टीफ़िकेशन ऑफ़ पोटेन्शियल ऐण्टी इनफेक्टिव एजेण्ट्स	डॉ एम आई सिद्दीकी
67.	राकेश आर्या	डिफ़रेन्शियल रोल ऑफ़ HSP60 इन कैन्सर	डॉ दीपक दत्ता
68.	प्रगति अग्निहोत्री	स्ट्रक्चरल ऐण्ड फ़ंक्शनल स्टडीज़ ऑफ़ एल डोनोवनीटाइपैनोथयन बायोसिन्थिसिज पाथवे ऐण्ड *वी. कॉलरा* RNA-पॉलीमरेज़ सिग्मा फैक्टर	डॉ जे वी प्रताप
69.	ओम प्रकाश सिंह पटेल	सिथिसिज़ ऑफ़ फ़ंक्शनलाइज़्ड इन्डोल्स, पिरीडीन्स ऐण्ड रिलेटेड N-हेट्रोसाइकल्स ऐज़ ऐण्टीहाइपर ग्लाइसेकिक एजेण्ट्स	डॉ पी पी यादव
		सीएसआईआर-सीडीआरआई, एसीएसआईआर	
70.	निकुंज सेठी	ए नॉवेल मेटाबोलोमिक्स बेस्ड ऐप्रोच फ़ॉर स्टडींग टेरारोजेनिक पोटेन्शियल ऑफ़ ड्रग्स एण्ड केमिकल्स एम्प्लाइंग न्यूक्लिअर मैग्नेटिक रेजोनेन्स स्पेक्ट्रोस्कोपी	डॉ नीरज सिन्हा
71.	विकेक कुमार पवार	नैनोकैरियर्स फ़ॉर इफेक्टिव डिलीवरी ऑफ़ केमोथेराप्यूटिक एजेण्ट्स अगेन्स्ट ब्रेस्ट कैन्सर	डॉ मनीष के चौरसिया
72.	सरोज वर्मा	ए सर्च फ़ॉर पोटेन्शियल न्यू ऐण्टी मलेरियल मॉलीक्यूल्स फ्रॉम 'इन सिलिको' रैशनेल्स फ़ॉर इन सीटू एक्सप्लोरेशन	डॉ वाई एस प्रभाकर
73.	रेनू पाण्डे	डिवेलपमेन्ट ऐण्ड वैलिडेशन ऑफ़ लिक्विड क्रोमैटोग्राफ़ी टैनडम मास स्पेक्ट्रोमीट्री (LC-MS/MS) मेथड्स फ़ॉर द क्वांन्टिटेटिव ऐण्ड क्वान्टिटेटिव एनालिसिस ऑफ़ बायोऐक्टिव मेटाबोलाइट्स फ्रॉम सेलेक्टेड इण्डियन मेडिसिनल प्लाण्ट्स	डॉ बृजेश कुमार
74.	श्वेता मिश्रा	क्लोनिंग कैरेक्टराइज़ेशन एण्ड वैलिडेशन ऑफ *ब्रूजिया मलाइ* UDP-गैलेक्टोपाइरैनोज़ म्यूटेज़ ऐज़ ऐन एण्टीफ़ाइलेरियल ड्रग टार्गेट	डॉ शैलजा भट्टाचार्य
75.	सारिका गुंजन	एक्स प्लोटेशन ऑफ़ मेकैनिज़्म इनवॉल्ण्ड पैरासाइट सेल डेथ एण्ड देयर एक्सप्लाइटेशन टु कन्ट्रोल मलेरिया	डॉ रेनू त्रिपाठी
76.	ईशा तनेजा	प्रो. क्लीनिकल फ़ार्मा कोकायनेटिक कैरेक्टराइजेशन ऑफ मेडीकर्पिन एण्ड प्रोडेक्शन ऑफ इट्स ह्यूमन फार्माकोकाइनेटिक्स यूजिंग स्पशीज़ इनवेरिअन्ट टाइम एप्रोच बेस्ड ऑन ऐलोमीट्री कॉन्सेप्ट	डॉ वहाजुद्दीन
77.	प्रियंका कुशवाहा	टु स्टडी द रोल ऑफ miRNA's इन द रेगुलेशन ऑफ़ वोन मास	डॉ ऋतु त्रिवेदी
78.	अवन्तिका सिंह	ऐप्लिकेशन ऑफ़ हाइफ़ेनेटेड मासस्पेक्ट्रोमीट्रिक टेक्नीक्स इन क्वालिटेटिव एण्ड क्वान्टिटेटिव एनालिसिज़ ऑफ़ फ़ाइटोकेमिकल्स फ्रॉम सेलेक्टेड इण्डियन मेडिसिनल प्लाण्ट्स	डॉ ब्रजेश कुमार
79.	हेमलता द्विवेदी	स्टडी ऑफ़ होस्ट पैथॉजन इण्टरैक्शन एण्ड केमोथेराप्यूटिक इण्टरवेंशन ड्यूरिंग सेरेब्रल मलेरिया	डॉ रेनू त्रिपाठी
80.	अंकुर ओमर	एक्सप्लोरिंग मल्टीस्केल रोल ऑफ़ सम सेलेक्टेडेट मॉलीक्यूल्स अगेन्स्ट कैंसर	डॉ पूनम सिंह
81.	ज्योति गुप्ता	इवैल्युएशन ऑफ़ इम्यूनोप्रोफ़ाइलैक्टिक एफ़िक्रेसी ऑफ डी एन ए वैक्सीन एम्प्लाइंग *ब्रूजिया मलाई* हेवी-चेन मायोसिन (Bm-My) एण्ड ट्रेहलोज़-6 फॉस्फ़ेट फॉस्फेट (Bm-TTP)	डॉ शैलजा भट्टाचार्य
82.	कनुभुरी शिवा राम राजू	इन्वेस्टीगेशन ऑफ़ प्री क्लीनिकल फ़ार्माकोकाइनेटिक्स ऑफ आइसोफॉर्मोनोनेटिन, ए पोटेन्शियल एण्टी ओस्टियोपोरोटिक कम्पाउण्ड एण्ड आइसोफ्लेवॉन्स - ड्रग इण्टरैक्शंस	डॉ वहाजुद्दीन
83.	धनवंतरी	मॉलीक्युलर कैरेक्टराइज़ेशन ऑफ ट्रान्सक्रिप्शन एलनगेशन फ़ैक्टर (Wor GreA) ऑफ़ बैक्टीरिया इण्डो सिमबांएण्ट बॉलबैचिया ऑफ फ़ाइलेरियल पैरासाइट *ब्रूजिया मलाइ*	डॉ शैलजा भट्टाचार्या
84.	सुनीता सक्सेना	आइडेन्टीफिकेशन एण्ड कैरेक्टराइज़ेशन ऑफ़ माइक्रोफ्राइलेरिया एण्टीजेन	डॉ नीलू सिंह
85.	स्वाति जयसवाल	प्री क्लीनिकल फार्मा कोकाइनेटिक प्रोफाइलिंग ऑफ नॉवे एण्टीकैंसर कम्पाउण्ड्स एण्ड पॉपुलेशन PK-PD मॉडलिंग ऑफ माइल्हफोज़िन	डॉ जवाहर लाल
86.	साइमा	ग्रीन ऐप्रोचेज़ टुवर्ड्स फार्मेशन ऑफ S-S एण्ड C-X (X = S, N) वॉण्ड्स एण्ड देयर एप्लिकेशन इन सिंथिसिज़ ऑफ़ बायोऐक्टिव मॉलीक्यूल्स	डॉ अरूण के सिन्हा
87.	कपिल देव	फ़ाइटोकेमिकल इन्वेस्टीगेशन ऑफ़ मेडिसिनल प्लाण्ट्स एण्ड डिवेपलमेन्ट ऑफ़ न्यू मेथाडॉलॉजीज़ फ़ॉर द सिंथिसिज़ ऑफ़ बायोएंक्टिव इण्डोल ऐनालॉग्स	डॉ राकेश मौर्या
88.	नागेशवर नागराजन	स्टडी ऑन द रोल ऑफ़ ऐस्ट्रोसाइटिक इंसुलिन रिसेप्टर सिगनलिंग इन न्यूरोइन्फ़्लनेशन एण्ड मेमोरी इम्पेयरमेन्ट	डॉ राकेश शुक्ला

89.	पंकज कुमार सिंह	लिगॅन्ड ऐंकर्ड पॉलीमरिक नैनोपार्टिकल सिस्टम फ़ॉर इफ़ेक्टिव ट्रीटमेंट ऑफ़ विसरल लीशमैनियासिस	डॉ मनीष के चौरसिया
90.	विकास वाजपेई	डवलेप्मेंट एण्ड वैलिडेशन ऑफ DART MS एण्ड LC-ESI-MS/MS मेथड्स फ़ॉर क्वालिटेटिव एण्ड क्वान्टिटेटिव ऐनालिसिस ऑफ फ़ाइटोकेमिकल्स फ्रॉम सेलेक्टेड इण्डियन मेडिसिनल प्लाण्ट्स	डॉ बृजेश कुमार
91.	प्रीति चन्द्रा	केमिकल प्रोफाइलिंग एण्ड क्वान्टिटेटिव स्टडीज़ ऑन बायोऐक्टिव फाइटोकंपाउण्ड्स इन सेलेक्टेड मेडिसिनल प्लांट्स यूजिंग हाइफ़नेटेड लिक्विड क्रोमैटोग्राफ़ी हैनडेम मास स्पेक्ट्रोमीट्रिक टेक्नीक्स	डॉ बृजेश कुमार
92.	अभिलाषा सक्सेना	एन *इन विट्रो* इवैल्युएशन ऑफ़ एण्टील्युकीमिक ऐक्टिविटी ऑफ़ टू प्लाण्ड एक्स ट्रैक्ट्स अगेन्स्ट एक्यूट मायलॉयड ल्यूकीमिया	डॉ आर के सिंह
93.	योगेश अवासी थोपटे	डवल्पमेंट ऑफ़ ग्रीन सिन्थेटिक मेथाडॉलॉजीज़ फ़ॉर बायोलॉजिकली इम्पॉर्टेन्ट स्मॉल मॉलीक्यूल्स एम्प्लॉइंग कार्बन-कार्बन एण्ड कार्बन हेट्रोटम बॉण्ड ब्रेकेज/कॉन्सट्रक्शन स्ट्रैटजी	डॉ अरूण के सिंह
94.	नीतू सिंह	स्टडी ऑन द रोल ऑफ़ फैटी ऐसिड सिन्थेज़ इन पल्मोनरी हाइपरटेंशन एण्ड इट्स एसोसिएटेड डिस्फ़ंक्शन्स	डॉ काशिफ़ हनीफ़
95.	सीमा सिंह	अंडरस्टैंडिंग द NMDAR एण्टागोनिस्ट इन्ड्यूज्डबिहेवियरल एण्ड न्यूरोकेमिकल चेन्जेज़ इन माइस मिमिकिंग साइकोसिस	डॉ शुभा शुक्ला
96.	नितिन हाउसराव आन्ध्रे	ग्रीन सिंथिसिज़ बायोऐक्टिव फ़ेनोलिक्स बोरिंग हेट्रोसाइक्लिक मॉइटीज़ एण्ड इवैल्युएशन ऑफ़ देयर बायोलॉजिकल ऐक्टिविटी	डॉ अरूण के सिन्हा
97.	शोम शंकर भूनिया	डिज़ाइन, सिंथिसिज एण्ड मॉलीक्युलर मॉडलिंग स्टडीज़ ऑन सबस्टीट्यूटेड इण्डोल्स ऐज़ पोटेन्शियल एण्टी ऑम्बोटिक एजेण्ट्स	डॉ ए के सक्सेना
98.	शरद चन्द्रा	मॉलीक्युलर मॉडलिंग एण्ड केमइन्फॉर्मेटिक्स स्टडीज़ ऑन सेलेक्टेड प्रोटीन ड्रग टार्गेट्स इन्वॉलण्ड इन टाइप टडाइबिटीज	डॉ एम आई सिद्दीकी
99.	श्वेता कौशिक	मॉलीक्युलर बेसिस ऑफ़ आइसोफ्लोवॉन्स जेनिस्टीन एण्ड डेडज़ीन रेगुलेशन ऑफ़ सेन्टक्रोमान एक्शन इन ह्यूमन ब्रेस्ट कैंसर	डॉ अनिल के बालापुरे
100.	मोनिका मित्तल	कैरेक्टराइज़ेशन ऑफ़ ऐल्डिहाइड डिहाइड्रोजेनेस ऐज़ ए बोन ऐनाबोलिक टार्गेट्स एण्ड इट्स फ़ार्माकोलॉजिकल मैनिपुलेशन	डा. नैबेध चट्टोपाध्याय
		आईएफटीएम यूनिवर्सिटी, मुरादाबाद	
101.	शुभ्रा सिंह	ए स्टडी ऑन मॉड्युलेशन ऑफ़ माइकोबैक्टीरियल ऐक्टिविटी ऑफ़ माउस मैक्रोफेजेज़ बाइ नाइट्रिक ऑक्साइड डोनर्स	डा. विनीता चतुर्वेदी

2.1 पोस्ट ग्रेजुएट छात्रों को प्रशिक्षण

कैलेण्डर वर्ष के दौरान देश भर के विभिन्न 48 कॉलेजो/विश्वविद्यालयों और संबद्ध कॉलेजो से 121 छात्रों का मैरिट के आधार पर चयन हुआ और उनको औषधि और औषधि निर्माण अनुसंधान में विभिन्न विषयों में 4-10 महीनों का प्रशिक्षण दिया गया।

2.2 पोस्ट ग्रेजुएट छात्रों को प्रशिक्षण

नाइपर रायबरेली का परामर्शदाता संस्थान होने के कारण सीएसआईआर-सीडीआरआई ने 30 एम एस (फार्मा) फ़ार्मास्युटिक्स और मेडिसिनल केमिस्ट्री स्पेशलाइज़ेशन के छात्रों को बायोमेडिकल रिसर्च में एक वर्ष का परियोजना प्रशिक्षण प्रदान किया।

2.3 आईएनएसए और एनएएसआई के सहयोग के अंतर्गत प्रशिक्षण

कार्यक्रम के अंतर्गत 08 आईएनएसए और एनएएसआई फ़ेलो को बायोमेडिकल रिसर्च के विभिन्न पक्षों में प्रशिक्षण प्रदान किया गया।

3. सीएसआईआर-सीडीआरआई स्टाफ को प्रशिक्षण

रिपोर्टिंग वर्ष के दौरान सीएसआईआर-सीडीआरआई के निम्नलिखित वैज्ञानिकों/टेक्निकल स्टाफ़ ने विभिन्न विषयों में अपने ज्ञान और विशेषज्ञता को अद्यतन करने के लिये विभिन्न प्रशिक्षण कार्यक्रमों और कार्यशालाओं में प्रशिक्षण प्राप्त किया।

स्टाफ का नाम	कार्यक्रम का शीर्षक	स्थान	दिनांक
डॉ शैलजा भट्टाचार्य	सीपीसीएसईए नॉमिनी (वैज्ञानिक) हेतु तीन दिवसीय प्रशिक्षण कार्यक्रम	नेशनल इन्स्टीट्यूट ऑफ़ ऐनिमल वेलफेयर, फरीदाबाद	24-26 मई, 2016
डॉ ए के द्विवेदी	गुड गवर्नेन्स और पारदर्शिता पर प्रशिक्षण कार्यक्रम	सीएसआईआर- एचआरडीसी गाजियाबाद	18-20 फरवरी 2016
डॉ भूपेन्द्र एन सिंह	मैनेजमेंट प्रशिक्षण	एच आर डी सी, गाजियाबाद	4-6 मई, 2016
डॉ मनीष के चौरसिया	साइंस गवर्नेन्स और मैनेजमेंट पर प्रशिक्षण पाठ्यक्रम	ए एस सी आई, हैदराबाद	29 फरवरी-04 मार्च 2016
डॉ विवेक भोंसले	*इन सिलिको* स्ट्रैटजीज़ फ़ॉर डिज़ीज़ पाथवे एनालिसिज़ एण्ड बायोमार्कर डिस्कवरी	बायोटेक पार्क, लखनऊ	29-31 मार्च, 2016
डॉ रवि शंकर भट्टा	वर्कशॉप ऑन डेटा एनालिसिज़ यूजिंग NONMEN	ACTREC, मुम्बई	01-03 अगस्त 2016
	जी एल पी ट्रेनिंग	इण्डिया हैबिटैट सेन्टर, नई दिल्ली	19-23 दिसम्बर 2016

राजेश कुमार झा	मैनडेटरी ट्रेनिंग प्रोग्राम (साइंटिस्ट), CPCSEA	नेशनल इन्स्टीट्यूट ऑफ़ ऐनिमल वेलफेयर, फरीदाबाद	24-26 मई 2016
डॉ जियाउर आर गाइन	जी एल पी ट्रेनिंग	इण्डिया हैबिटैट सेन्टर, नई दिल्ली	17-18 अक्टूबर 2016
	सी पी सी एस ई ए ट्रेनिंग	नेशनल इंस्टीट्यूट ऑफ़ ऐनिमल वेलफ़ेयर, फ़रीदाबाद	24-28 अक्टूबर 2016
डॉ शरद शर्मा	ट्रेनिंग ऑन गुड लेबोरेटरी प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	8-9 अगस्त 2016
डॉ एस के	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआर, लखनऊ	8-9 अगस्त 2016
	4th जी एल पी इंसपेक्टर्स ट्रेनिंग	एनजीसीएमए, नई दिल्ली	19-24 दिसम्बर 2016
	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	13 जनवरी, 2017
डॉ आमिर गजिर	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	8-9 अगस्त 2016
डॉ स्मृति भदौरिया	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	8-9 अगस्त 2016
डॉ सारिका सिंह	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	8-9 अगस्त 2016
डॉ नम्रता रस्तोगी	''बिज़िबिल लाइट फ़ोटोरिडॉक्स कैटलिसिज़ टुवर्ड्स सस्टेनेबल फ्यूचर ''अण्डर ग्लोबल इनीशिएटिव ऑन एकेडमिक नेटवर्कस (GIAN) प्रोग्राम	आई आई एस ई आर, भोपाल	22 अगस्त-02 सितम्बर 2016
डॉ पी के अग्निहोत्री	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	08-09 अगस्त 2016
श्री सदन कुमार	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	08-09 अगस्त 2016
श्री अनुराग कुमार श्रीवास्तव	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	08-09 अगस्त 2016
श्री अनिल कुमार मीना	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	08-09 अगस्त 2016
श्री नवोदयम कल्लेटी	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	08-09 अगस्त 2016
श्री सुधाकर यादव	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	08-09 अगस्त 2016
श्रीमती अनुपमा सक्सेना	ट्रेनिंग ऑन गुड लेबोरेट्री प्रैक्टिस	सीएसआईआर-सीडीआरआई, लखनऊ	08-09 अगस्त 2016

सम्मान एवं पुरस्कार

डॉ रेणु त्रिपाठी

इलेक्टेड फेलो ऑफ नेशनल अकेडमी ऑफ साइन्सेज ऑफ इंडिया (एनएएसआई)

डॉ संजय बत्रा

इलेक्टेड फेलो ऑफ नेशनल अकेडमी ऑफ साइन्सेज ऑफ इंडिया (एनएएसआई)

डॉ सब्यसाची सन्याल

इलेक्टेड फेलो ऑफ नेशनल अकेडमी ऑफ साइन्सेज ऑफ इंडिया (एनएएसआई)

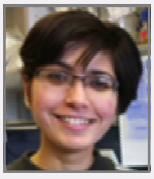
डॉ राजेंद्र सिंह

डिपार्टमेन्ट ऑफ बायोटेक्नोलॉजी द्वारा इन्नोवेटिव यंग बायोटेक्नोलोजिस्ट अवार्ड (आईवाईबीए)

डॉ नीति कुमार

डिपार्टमेन्ट ऑफ बायोटेक्नल जी द्वारा इन्नोवेटिव यंग बायोटेक्नोलोजिस्ट अवार्ड (आईवाईबीए)

सीटीडीडीआर-2016 में बेस्ट पोस्टर प्रेजेंटेशन अवार्ड



डॉ ए के द्विवेदी

डॉ अनिमेष चक्रबर्ती मेमोरियल व्याख्यान, 26वीं एन्युयल कोन्फ्रेंस ऑफ इंडियन फार्माकोलोजिकल सोसाइटी, कोलकाता

डॉ आर पी त्रिपाठी

असोसिएशन ऑफ कार्बोहाइड्रेट केमिस्ट एंड टेक्नोलोजिस्टस (इंडिया) द्वारा लाइफ टाइम अचीवमेंट अवार्ड-2016

डॉ अतुल गोयल

द केमिकल रिसर्च सोसाइटी ऑफ इंडिया, बेंगलुरु द्वारा सीआरएसआई ब्रोंज मेडल अवार्ड-2016 इंटेरनेशनल कोन्फ्रेंस ऑन मटेरियल्स इंजिनियरिंग एंड नेनोटेक्नोलोजी, ताइपेई, ताईवान में बेस्ट ओरल प्रेजेंटेशन अवार्ड

डॉ मुकेश पसुपुलेती

एसोसिएशन ऑफ बायोटेक्नोलोजी एंड फार्मेसी, इंडिया द्वारा सीनियर साइंटिस्ट अवार्ड-2016
वीनस इंटेरनेशनल फाउंडेशन, चेन्नई द्वारा आउटस्टेंडिंग साइंटिस्ट-2016 अवार्ड
मेरीना लेब्स, चेन्नई द्वारा ड एपीजे कलाम अवार्ड फॉर साइंटिफिक एक्सिलेंस-2016

डॉ रबी शंकर भट्टा

द बोस्टन सोसाइटी, यूएसए द्वारा डिस्टिंग्युश्ड स्पीकर अवार्ड

डॉ आमिर नाजिर

सीएसआईआर द्वारा रमन रिसर्च फेलोशिप

डॉ स्मृति भदोरिया

आईएनएसए-डीएफजी द्वारा आईएनएसए-डीएफजी बाइलेटरल एक्सचेंज प्रोग्राम हेतु चयनित

डॉ वहाजुद्दीन

इंटेरनेशनल यूनियन ऑफ बायोकेमिस्ट्री एंड मोलिक्यूलर बायोलॉजी, कनाडा द्वारा यंग साइंटिस्ट अवार्ड-2016

उत्तर प्रदेश सरकार द्वारा यंग साइंटिस्ट अवार्ड

एकेदेमी ऑफ साइन्स इन डेवेलपिंग वर्ल्ड (टीडबल्यूएएस) एवं फाउण्डेशन पोर यूनिवर्सिते दे लिय न द्वारा TWAS/BVL.NXT-2016 फेलोशिप

डॉ राजेश झा

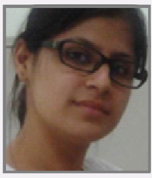
इंडियन सोसाइटी फॉर द स्टडि इन रिप्रोडक्शन एंड फर्टिलिटी द्वारा प्रो. जीपी तलवार यंग साइंटिस्ट अवार्ड-2016

डॉ काशिफ हनीफ

यूनाइटेड थेरेप्युटिक्स(यूएसए) द्वारा प्रायोजित पल्मोनरी वेस्कुलर रिसर्च इंस्टीट्यूट (यूके) की सदस्यता

सुश्री श्वेता शर्मा (डॉ पीआर मिश्रा की छात्रा)

महिला शोध छात्रा के लिए डॉ स्वर्ण नित्यानन्द मेमोरियल अर्ली केरियर एचिवमेंट अवार्ड-2016

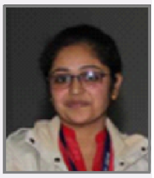


डॉ के आर आर्या

सोसाइटी ऑफ एथनोबोटनिस्ट्स, इंडिया द्वारा वर्ष 2015-16 के लिए डॉ बी एन मेहरोत्रा मेडल

सुश्री पल्लवी अवस्थी (डॉ अतुल गोयल की छात्रा)

यूरोपियन जर्नल ऑफ ओर्गेनिक केमिस्ट्री, विली, teZhh eacLV ikLVj vokMZ 2016



डॉ सामला श्रीनिवास (बीजोय कुंडु के छात्र)

डॉ एम एम धर मेमोरियल डिस्टिंगुश्ड केरियर एचिवमेंट अवार्ड-2016 (केमिकल साइन्सेज)

श्री गुरु आर वलीचेर्ला (डॉ जिया उर गाईन के छात्र)

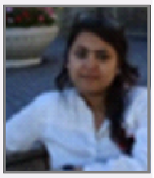
अमेरिकन एसोसिएशन ऑफ फार्मास्युटिकल साइंटिस्ट्स, यूएसए द्वारा एएपीएस ग्रेजुएट स्टूडेंट रिसर्च अवार्ड

मो. परवेज खान (डॉ नेबेद्रय चट्टोपाध्याय के छात्र)

डॉ एम एम धर मेमोरियल डिस्टिंगुश्ड केरियर एचिवमेंट अवार्ड-2016 (बायोलौजिकल साइन्सेज)

सुश्री हफ्सा अहमद (डॉ ए के द्विवेदी की छात्रा)

सोसाइटी ऑफ एथनोबोटनिस्ट एंड प्लांट टेक्सोनोमी द्वारा सीएसआईआर-एनबीआरआई, लखनऊ में आयोजित नेशनल सेमिनार ऑन ग्लिम्प्सेस ऑफ रिसर्च वर्क इन टेक्सोनोमी एंड एथनोबोटनी में बेस्ट पेपर प्रेजेंटेशन अवार्ड

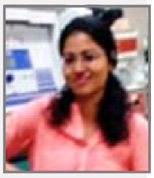


डॉ हार्दिक चंडासना (डॉ रबी शंकर भट्टा के छात्र)

डॉ जे एम खन्ना मेमोरियल डिस्टिंगुश्ड केरियर एचिवमेंट अवार्ड-2016 (प्री क्लीनिकल एंड क्लीनिकल साइन्सेज)

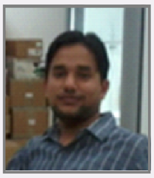
सुश्री ज्योतिबाला कौशल (डॉ अनिला द्विवेदी की छात्रा)

इंटेरनेशनल कोन्फ्रेंस ऑन रीप्रोडक्टिव हैल्थ विथ एम्फेसिस ऑन अकुपेशनल, एनवायरमेंटल एड लाइफस्टाइल फेक्टर्स तथा 26 वीं एन्युयल मीटिंग ऑफ इंडियन सोसाइटी फॉर द स्टडि इन रिप्रोडकशन एंड फर्टिलिटी द्वारा बेस्ट पोस्टर अवार्ड



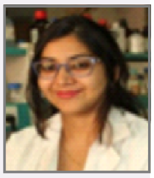
श्री साजिद खान (डॉ सईद मुस्थपा मीरन के छात्र)

डॉ जे एम खन्ना मेमोरियल अर्ली केरियर एचिवमेंट अवार्ड-2016



सुश्री सोनल श्रीवास्तव (डॉ एस के रथ की छात्रा)

नेशनल कोन्फ्रेंस ऑन रीसेंट एड्वान्सेज इन बायोमेडिकल साइन्सः डायोग्नोसिस एंड रिसर्च बायोमेडकॉम 2016 में बेस्ट पोस्टर अवार्ड



75 Years of
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CSIR-Central Drug Research Institute, Lucknow

आयोजित प्रमुख कार्यक्रम

65 वां वार्षिक दिवस समारोह

17 फरवरी 2016 को सीएसआईआर-सीडीआरआई ने अपना 65वां वार्षिक दिवस मनाया इस अवसर पर सुबह 41वें सर एडवर्ड मेलनबी स्मृति व्याख्यान में आईसीएमआर की महानिदेशक डा सौम्या

स्वामीनाथन ने अपने सम्बोधन में कहा की भारत को वर्ष 2050 तक टीबी मुक्त बनाने के लिए हमें कड़ी मेहनत करनी होगी। पिछले 200 सालों में लगभग 100 करोड़ लोग इस बीमारी से मारे जा चुके हैं। अनेक नई दवाएं जैसे बेंडाकुइलिन एवं लाइनेजोलिड जिनके परीक्षण अफ्रीका में हो चुके हैं शीघ्र ही भारत में भी उपलब्ध होंगी जो एमडीआर टीबी में भी बहुत उपयोगी हैं।

कार्यक्रम के दूसरे सत्र में कार्यक्रम के मुख्य अतिथि डा राकेश कपूर, डायरेक्टर एसजीपीजीआई, लखनऊ थे एवं कार्यक्रम की अध्यक्षता डा सौम्या स्वामीनाथन ने की। संस्थान की निदेशिका डा मधु दीक्षित ने वार्षिक प्रतिवेदन प्रस्तुत किया तथा संस्थान द्वारा वर्ष भर में किये गए कार्यों एवं उपलब्धियों के बारे में बताया। इसके पश्चात डा राकेश कपूर ने अपने सम्बोधन में कहा कि एसजीपीजीआई, लखनऊ सीडीआरआई लखनऊ के साथ मिलकर हेल्थ रिसर्च पर काम करने किए लिए सदैव तत्पर हैं। दोनों संस्थान इस क्षेत्र में मिलकर कार्य करते हैं तो नई औषधि रिसर्च के माध्यम से मानवता की सेवा और अधिक कर सकते हैं, एवं जन सामान्य तक स्वस्थ सुविधाएँ पहुंचा कर स्वस्थ भारत-सशक्त भारत के मिशन को पूरा करने में अपना योगदान दे सकते हैं साथ ही नई औषधि के विकास से मेक इन इंडिया कार्यक्रम को भी बल प्रदान किया जा सकता है।

इसके पश्चात संस्थान ने ऐरन, मुंबई एवं फर्मेंजा फार्मास्यूटिकल के सहयोग से शीशम के पत्तों से निर्मित नई दवा-रीयूनियन की लांचिंग की। यह दवा अस्थियों में फ्रेक्चर हीलिंग तथा अस्थियों एवं जोड़ों कीं सूजन तथा रजोनिवृत्ति के बाद अस्थियों के स्वास्थ के प्रबन्धन के लिए बहुत उपयोगी है।

इसके पश्चात औषधि में उत्कृष्ट अनुसन्धान के लिए सीडीआरआई एक्सीलेंस अवार्ड-2016 की घोषणा की गई। यह अवार्ड इसी वर्ष सीएसआईआर के स्थापना दिवस पर प्रदान किये जायेंगे बायोलॉजी के क्षेत्र में यह अवार्ड आईआईएससी बेंगलुरु के प्रोफ पेट्रिक डिसिल्वा को मिलेगा एवं केमिकल साइंस में अवार्ड आईआईसीटी हैदराबाद के डा एंथोनी अदलगट्टा को दिया जायेगा।

इसके बाद संस्थान के 5 शीर्ष प्रकाशनों मुख्य पेटेंट्स एवं इस टेक्नोल जी को भी पुरस्कृत किया गया। शोध छात्रों को उत्कृष्ट शोध के लिए विभिन्न अवार्ड भी प्रदान किये गए। डा एमएम धर मेमोरियल डिस्टिंग्यूश्ड कॅरियर अचीवमेंट अवार्ड -2016 डा सामला श्रीनिवास (केमिकल साइंस), डा एमएम धर मेमोरियल डिस्टिंग्यूश्ड कॅरियर अचीवमेंट अवार्ड -2016 मो. परवेज (बायोलॉजिकल साइंस), डा जे एम खन्ना मेमोरियल डिस्टिंग्यूश्ड कॅरियर अचीवमेंट अवार्ड -2016 डा हार्दिक चाण्डासना (प्री-क्लिनिकल साइंस), डा जे एम खन्ना मेमोरियल अर्ली कॅरियर अचीवमेंट अवार्ड -2016 साजिद खान एवं डा स्वर्ण नित्यानंद अर्ली कॅरियर अचीवमेंट अवार्ड फॉर विमेन रिसर्च स्कॉलर -2016 श्वेता शर्मा को दिया गया।

कार्यक्रम के अंत में डा सौम्या स्वामीनाथन ने अपने अध्यक्षीय भाषण में भविष्य में हेल्थ सेक्टर के अनेक चैलेंजेज पर ध्यान केंद्रित करने के लिए अपने अनुसन्धान की दिशा बदलने पर जोर दिया। उन्होने कहा की हमें अपने ट्रेडिशनल नॉलेज को मॉडर्न नॉलेज के साथ मिला कर रिसर्च करना होगा जैसा की एक उदाहरण अभी सीडीआरआई ने अपनी नई दवा के माध्यम से दिया है। कार्यक्रम का समापन ऑर्गनाइजिंग कमिटी के चेयरमैन डा राकेश शुक्ला के धन्यवाद प्रस्ताव से हुआ।

करेंट ट्रेंड्स इन ड्रग डिस्कवरी एंड रिसर्च पर छठवीं अंतरराष्ट्रीय संगोष्ठी

सीएसआईआर-सीडीआरआई में 25-28 फरवरी तक करेंट ट्रेंड्स इन ड्रग डिस्कवरी एंड रिसर्च पर छठवीं अंतरराष्ट्रीय संगोष्ठी का आयोजन किया गया। इस चार दिन लम्बी संगोष्ठी में अनेक महत्वपूर्ण व्याख्यान तथा रिसर्च पेपर प्रेजेंट किये गए। देश विदेश से लगभग 800 वैज्ञानिक, शिक्षाविद एवं शोध छात्र नें इस संगोष्ठी में भाग लिया जो 28 फरवरी को विज्ञान दिवस समारोह पर सम्पन्न हुई।

कार्यक्रम के उद्घाटन पर संस्थान की निदेशक, डा मधु दीक्षित ने सभी अतिथियों एवं प्रतिभागियों का स्वागत किया। कार्यक्रम के मुख्य

अतिथि, इंग्लैंड की यूनिवर्सिटी ऑफ़ डंडी के मेडिसिनल केमेस्ट्री विभाग के प्रमुख प्रोफेसर इयान गिल्बर्ट ने कहा कि जिस तरह से ट्रॉपिकल कंट्रीज में डिजीज बर्डन एवं उसकी वजह से जो मृत्यु दर बढ़ रही है उसके मद्देनजर हमें अब उपेक्षित बीमारियों जैसे मलेरिया व ट्यूबरकुलोसिस के लिए ड्रग डेवलपमेंट पर विशेष ध्यान देना होगा। इसके पश्चात कार्यक्रम की अध्यक्षता करते हुए इंडियन इंस्टिट्यूट ऑफ़ साइंसेज बेंगलुरु के प्रोफेसर एवं सीएसआईआर-सीडीआरआई के पूर्व निदेशक डा तुषारकांति चक्रवर्ती ने इस संगोष्ठी के सफल आयोजन के लिए शुभकामना दी एवं कहा ट्रापिकल कंट्रीज विशेषकर विकासशील देशों के विकास के लिए उपेक्षित बीमारियों के लिए ड्रग डेवलपमेंट की बहुत आवश्यकता है। चार दिवसीय संगोष्ठी के दौरान सभी प्रतिभागी अभूतपूर्व वैज्ञानिक चर्चाओं के साक्षी बनें। संगोष्ठी के समापन के अवसर पर युवा वैज्ञानिकों को बेस्ट ओरल प्रेजेन्टेशन के लिए पुरस्कार दिए गए। यूनिवर्सिटी ऑफ़ मद्रास, चेन्नई की सुश्री दिव्या थॉमस एवं सीडीआरआई लखनऊ की सुश्री सोनल को यह पुरुस्कार दिया गया। विभिन्न शोध क्षेत्रों में उत्कृष्ट अनुसन्धान के लिए बारह अन्य युवा वैज्ञानिकों को बेस्ट पोस्टर प्रेजेंटेशन अवार्ड भी दिए गए। कार्यक्रम के अंत में आयोजन सचिव डॉ. अरुण कुमार सिन्हा ने चार दिन लम्बे इस बृहत् वैज्ञानिक आयोजन के सफलता पूर्वक संपन्न होने पर सभी प्रतिभागियों, आयोजक समिति के सदस्यों एवं प्रेस एंड मीडिया को धन्यवाद दिया।

एनएमआर स्पेक्ट्रोस्कोपी और मास स्पेक्ट्रोमीट्री द्वारा स्मॉल मॉलीक्यूल एनालिसिज़ पर राष्ट्रीय कार्यशाला

सैफ, सीएसआईआर-सीडीआरआई लखनऊ द्वारा 16-18 मार्च 2016 को एक तीन दिवसीय राष्ट्रीय कार्यशाला का आयोजन किया। सीएसआईआर-सीडीआरआई की निदेशक डा मधु दीक्षित ने प्रतिभागियों का स्वागत किया और कार्यशाला का उद्घाटन किया। डा बृजेश कुमार ने सीएसआईआर- सीडीआरआई में परिष्कृत विश्लेषणात्मक उपकरण सुविधा (सैफ) का परिचय प्रदान किया। डा रवि एस अम्पापति ने 700 MHz NMR सुविधा की जानकारी दी। डा राज रॉय सीबीएमआर, लखनऊ ने "मैगनेटिक रेजोनेन्सः ए प्रूफ ऑफ प्रिंसिपल फॉर प्लेथोरा ऑफ ऐप्लिकेशन्स" पर व्याख्यान प्रस्तुत किया मास स्पेक्ट्रोमीट्री बेसिक्स एण्ड ऐप्लिकेशन ऑफ एन एमआर स्पेक्ट्रोस्कोपी इन्स्ट्रूमेन्टेशन ऑफ एनएमआर स्पेक्ट्रोस्कोपी, बेसिक्स एण्ड ऐप्लिकेशन ऑफ मास स्पेक्ट्रोमीट्री पर कार्यशाला के दौरान विभिन्न व्याख्यान दिये गए। बाद में प्रतिभागियों को एनएमआर इन्स्ट्रूमेन्ट और मास इन्स्ट्रूमेन्ट में व्यवसायिक प्रशिक्षण प्रदान किया गया तथा कार्यशाला के समापन सत्र के दौरान एक क्विज और स्ट्रक्चर कैरेक्टराइजेशन एक्सरसाइज का आयोजन किया गया।

एचपीएलसी/यूपीएलसी पर दो दिवसीय कार्यशाला

सीएसआईआर-सीडीआरआई एवं वाटर्स इंडिया (प्रा.) लिमिटेड द्वारा संयुक्त रूप से एचपीएलसी/यूपीएलसी द्वारा मेथड डेवलपमेण्ट पर एक कार्यशाला का आयोजन 10-11 मार्च, 2016 को किया गया। सीडीआरआई एवं वाटर्स के विशेषज्ञों द्वारा इन उपकरणों के मूलभूत सिद्धांतों के बारे में जानकारी प्रदान की गई। इन उपकरणों पर आधारित नई विकसित विधियों का प्रदर्शन भी किया गया। पैंतीस से अधिक शोधपत्रों/तकनीकी स्टाफ ने इस कार्यशाला में भाग लिया एवं सजीव प्रदर्शनों एवं उनसे संबंधित चर्चाओं का अनुभव प्राप्त किया। सभी प्रतिभागियों ने विशेषज्ञों के साथ प्रायोगिक सत्रों में उत्साह से भाग लिया।

द्वितीय वैज्ञानिक और तकनीकी जागरूकता कार्यक्रम

प्रयोग में आने वाले जन्तुओं की मानवोचित देखभाल और वैज्ञानिक प्रबन्धन के विभिन्न पहलुओं पर संस्थान के शोध छात्रों को प्रारंभिक प्रशिक्षण प्रदान करने की दृष्टि से 6-8 अप्रैल, 2016 को रा ट्रीय प्रयोगशाला जन्तु केन्द्र, सीएसआईआर-सीडीआरआई, लखनऊ में ऐनिमल एक्सपेरीमेन्टेशन में वैज्ञानिक एवं तकनीकी जागरूकता कार्यक्रम का आयोजन किया गया। यह प्रशिक्षण कार्यक्रम संस्थान में जारी मानव संसाधन विकास कार्यक्रम का हिस्सा है जो संस्थान में समय-समय पर तिमाही अवधि में बैच के अनुसार आयोजित किया जाता रहता है। संस्थान के बायोलॉजिकल रिसर्च डिवीजन के 18 शोध छात्रों के बैच ने इसमें भाग लिया। अंतःस्रावी विज्ञान प्रभाग की वरिष्ठ प्रधान वैज्ञानिक एवं ऐनिमल हाउस ऐडवाइजरी कमेटी की अध्यक्ष डा अनिला द्विवेदी ने उद्घाटन सत्रा में प्रतिभागियों को संबोधित किया और उनके समक्ष इस जागरूकता कार्यक्रम के औचित्य एवं महत्व का वर्णन किया। प्रशिक्षण में प्रयोगात्मक जन्तुओं की देखरेख और प्रबन्धन के सैद्धान्तिक और प्रायोगिक पहलुओं को सम्मिलित किया गया जिसमें सामान्य जन्तु तकनीकों का वास्तविक प्रदर्शन भी शामिल था।

राष्ट्रीय प्रौद्योगिकी दिवस 2016

सीएसआईआर-सीडीआरआई, लखनऊ ने 11 मई 2016 को राष्ट्रीय प्रौद्योगिकी दिवस मनाया। इस अवसर पर प्रातः काल सीएसआईआर के महानिदेशक डा गिरीश साहनी ने वीडियो कॉन्फ्रेन्सिंग के द्वारा सीएसआईआर की सभी 38 प्रयोगशालाओं को संबोधित किया। उन्होंने सीएसआईआर परिवार के प्रत्येक सदस्य को मिलजुल कर समाज के लिये कार्य करने के लिये प्रेरित किया। उन्होने आम आदमी और उद्योग की समस्याओं के

समाधान हेतु प्रौद्योगिकियो को सौंपने पर जोर दिया। समारोह के सायंकालीन सत्र में निदेशक डा मधु दीक्षित ने इस अवसर पर सभी वैज्ञानिकों तथा शोध छात्रों को प्रौद्योगिकी के विकास की विरासत को जारी रखने के लिये अपनी शुभकामनाएं दी। नैशनल स्किल डेवलपमेन्ट कॉर्पोरेशन के चीफ एक्जीक्यूटिव ऑफिसर और टाटा कंसल्टेन्सी सर्विसेज़ के प्रिसिपल कन्सल्टेन्ट श्री जयन्त कृष्णा इस सत्र के मुख्य अतिथि थे। उन्होने ''इन्फॉर्मेशन टेक्नोलॉजी इन द सर्विस ऑफ मैनकाइन्ड'' पर विशेष व्याख्यान प्रस्तुत किया। प्रौद्योगिकी दिवस केशुभ अवसर पर श्री जयन्त कृष्णा और मंच पर उपस्थित अन्य गणमान्य अधिकारियों ने सीएसआईआर-सीडीआरआई न्यूज़लेटर खण्ड 7 अंक 2 का विमोचन किया। व्याख्यान में कई सौ शोध छात्रों के साथ वरि ठतम वैज्ञानिक पद्मश्री डा नित्यानन्द, डा बीएन धवन और डा वीपी कम्बोज भी उपस्थित थे। कार्यक्रम का समापन श्री विनय त्रिपाठी के धन्यवाद प्रस्ताव से साथ हुआ।

कॉन्फोकल माइक्रोस्कोपी पर राष्ट्रीय कार्यशाला

मानव संसाधन विकास, जो किसी संगठन के कर्मचारियों के ज्ञान, कौशल, शिक्षा और योग्यताओं के विकासत की प्रक्रिया है, इसके महत्व और आवश्यकता को ध्यान में रखते हुए, सीएसआईआर-सीडीआरआई

तथा कार्ल जीस ने संयुक्त रूप से 05-06 मई 2016 को कॉन्फोकल माइक्रोस्कोपी पर एक राष्ट्रीय कार्यशाला का आयोजन किया। कार्ल जीस ने डिमॉन्स्ट्रेशन के उद्देश्य से ई एम यूनिट में एक हाई एन्ड कॉनफोकल माइक्रोस्कोप प्रतिष्ठापित किया। वैज्ञानिकों एवं छात्रों ने नवीन तकनीक और विकास को सीखा और अपने नमूनों का विश्लेषण किया और माइक्रोस्कोप के कार्य निष्पादन मूल्यांकन किया।

हिन्दी की एक दिवसीय कार्यशाला

सरकार कामकाज की भाषा के रूप में हिन्दी का प्रयोग बढाने और राजभाषा अधिनियम के अनुपालन के लिये सीएसआईआर-सीडीआरआई में एक दिवसीय कार्यशालाओं का आयोजन 8 अप्रैल 2016 28 जून, 26 सितम्बर एवं 23 दिसम्बर, 2016 को किया गया कार्यशाला के दो सत्रा रहे-एक प्रशासनिक संवर्ग के सदस्यों के लिये और दूसरा वैज्ञानिकों एवं टेक्निकल स्टाफ के लिये जिसमे राजभाषा के रूप में हिन्दी की आवश्यकता और उपयोगिता के महत्व पर चर्चा की गई।

स्वच्छ भारत अभियान पखवाड़ा

स्वच्छ भारत अभियान भारत सरकार का राष्ट्रीय अभियान है। मिशन का लक्ष्य लोगो के व्यवहार में परिवर्तन और उनमें स्वास्थ्य संबंधी आदतों की प्रेरणा एवं उनमें स्वच्छता के प्रति जागरुकता फैलाना है। मिशन में योगदान के लिये सीएसआईआर-सीडीआरआई लखनऊ ने 30 मई 2016 से 13 जून 2016 तक ''स्वच्छ भारत अभियान पखवाड़ा'' का आयोजन किया। संस्थान के वैज्ञानिकों, तकनीकी और प्रशासनिक स्टाफ और शोध छात्रों ने इस कार्यक्रम में उत्साहपूर्वक भाग लिया। इस पखवाड़ा

के दौरान परिसर, कार्यालय और प्रयोगशालाओं की स्वच्छता हेतु बहुत से कार्यक्रमों का आयोजन किया गया।

विश्व तम्बाकू निषेध दिवस

प्रति वर्ष 31 मई को विश्व तम्बाकू निषेध दिवस का आयोजन किया जाता है। इस दिवस का आयोजन तम्बाकू के प्रयोग के व्यापक प्रचलन और उसके स्वास्थ्य पर पड़ने वाले बुरे प्रभावों की ओर ध्यान आकर्षित करने के अभिप्राय से किया जाता है जिसके कारण प्रतिवर्ष विश्व भर में लगभग 6 मिलियन मौते हो जाती है। इस अवसर पर सीएसआईआर- सीडीआरआई ने पब्लिक डेन्टिस्ट्री डिपार्टमेन्ट, किंग जार्ज मेडिकल यूनिवर्सिटी लखनऊ के सहयोग से सीडीआरआई में ओरल हेल्थ स्क्रीनिंग कैम्प का आयोजन किया जो ओरल प्रीकैन्सर कन्डीशन्स और ओरल कैन्सर पर केन्द्रित था। स्टाफ एवं शोध छात्रों के साथ बहुत से वैज्ञानिकों ने इसमें भाग लिया।

स्वास्थ्य परीक्षण कार्यक्रम

प्रतियोगितात्मक विश्व में बढती हुई मांग की पूर्ति के लिये अधिकांश लोग अपने स्वास्थ्य की उपेक्षा करते है जब तक कि वे किसी चिकित्सीय समस्या का सामना नहीं करते। बढ़ती हुई चिकित्सीय समस्याओं का सामना करने के लिये स्वयं के स्वास्थ्य को मॉनीटर करना अनिवार्य है। यदि स्वास्थ्य समस्याओं का पता शीघ्र लग जाए तो उनका प्रबंधन प्रभावी तरीके से किया जा सकता है। रक्षात्मक स्वास्थ्य परीक्षण के प्रति जागरूकता बढ़ाने के लिये सीएसआईआर-सीडीआरआई ने संस्थान में अपने 40 वर्ष से अधिक आयु के स्टाफ सदस्यों के ब्लड प्रेशर और रैण्डम शुगर स्वास्थ्य परीक्षण कार्यक्रम का आयोजन 7 अप्रैल 2016 को किया।

अन्तरर्राष्ट्रीय योग दिवस

सीएसआईआर-सीडीआरआई ने 21 जून 2016 को अन्तरराष्ट्रीय योग दिवस मनाया। 21 जून उत्तरी गोलार्ध में वर्ष का सबसे लम्बा दिन होता है और विश्व के अनेक भागों में इसका विशेष महत्व है और यह वर्ष का सबसे अधिक ऊर्जावान दिवस माना जाता है। संयुक्त राष्ट्र संघ की महासभा ने 11 दिसम्बर, 2014 को योग को शारीरिक, मानसिक और आध्यात्मिक प्रथा और विषय के रूप में विकसित करने के भारत के सदियो पुराने योगदान को सम्मान देने के लिये इस दिवस को अंतरर्राष्ट्रीय योग दिवस के रूप में मनाए जाने की घोषणा की। सीएसआईआर-सीडीआरआई ने 21 जून 2016 को सभी स्टाफ क्लब सदस्यों के लिये अन्तरर्राष्ट्रीय योग दिवस का आयोजन किया। बहुत से वैज्ञानिक एवं शोध छात्रों ने इसमें भाग लिया।

''फाइटो फार्मास्युटिकल इन ड्रग डिस्कवरी रिसर्च पर एक अर्ध दिवसीय सेमिनार

औषधीय एवं प्रक्रिया रसायन प्रभाग के प्रभागाध्यक्ष डा राकेश मौर्य की सेवानिवृत्ति पर 30 जून 2016 को सीएसआईआर-सीडीआरआई में ''फाइटो फार्मास्युटिकल इन ड्रग डिस्कवरी रिसर्च पर एक अर्ध दिवसीय सेमिनार का आयोजन किया गया। फाइटोफार्मास्युटिकल इन ड्रग डिस्कवरी रिसर्च पर उत्कृष्ट योगदान के लिये डॉ राकेश मौर्या का अभिनन्दन किया गया। डॉ मधु दीक्षित ने डा मौर्या को सेवानिवृत्ति के पश्चात खुशहाल एवं समृद्ध जीवन के लिये शुभकामनाएं दी।

शिक्षाविदों/वैज्ञानिकों का स्टडी टुअर

विभिन्न अनुसंधान संस्थानों/संपूर्ण देश के स्टेट ऐग्रीकल्चर विश्वविद्यालयों में कार्यरत शिक्षाविदो/वैज्ञानिकों का तेरह सदस्यी प्रशिक्षार्थी प्रतिनिधिमंडल ने जो फिश रिप्रोडक्टिव बायोटेक्नॉलॉजी में भाग लेने हेतु आए थे, 22 जुलाई 2016 के सीएसआईआर-सीडीआरआई का भ्रमण किया। स्टडी टुअर का मुख्य उद्देश्य स्वास्थ्य एवं औषधि विकास में संस्थान की भूमिका को जानना था। प्रतिनिधिमण्डल ने वैज्ञानिकों से बातचीत की और संस्थान की बडी अनुसंधान सुविधाओं को जाकर देखा।

मॉलीक्युलर डॉकिंग, वर्चुअल स्क्रीनिंग और कम्प्युटेशनल बायोलॉजी पर कार्यशाला

सीएसआईआर-सीडीआरआई में मॉलीक्युलर डॉकिंग और कम्प्यूटेशनल बायोलॉजी पर श्रोडिंजर एलएलसी के साथ 1-3 अगस्त 2016 को एक कार्यशाला का आयोजन किया गया। कार्यशाला में मॉलीक्युलर डॉकिंग और वर्चुअल स्क्रीनिंग तथा लीड आइडेंटीफिकेशन और ऑप्टिमाइजेशन के लिये विभिन्न सॉफ्टवेयर और केम इन्फॉर्मेटिक्स मेथड्स के प्रयोग पर सैद्धांतिक पृष्ठभूमि के साथ-साथ प्रायोगिक दृ टिकोण पर विस्तृत जानकारी प्रदान की गई। विभिन्न विश्वविद्यालयों, कालेजों और संस्थानों के 35 शिक्षाविदों, वैज्ञानिकों और शोध छात्रों ने कार्यक्रम में भाग लिया।

गुड लेबोरेट्री प्रैक्टिस ट्रेनिंग वर्कशॉप

8 अगस्त 2016 को गुड लेबोरेटरी प्रैक्टिस प्रशिक्षण कार्यशाला का आयोजन जीएलपी टेस्ट फैसिलिटी में संस्थान में विभिन्न पदों पर कार्यरत जीएलपी टास्क फोर्स को प्रशिक्षण प्रदान करने के उद्देश्य से किया गया। कार्यशाला का उद्घाटन निदेशक डा मधु दीक्षित के स्वागत भा ाण से हुआ। अपने संबोधन में उन्होंने कहा सीएसआईआर-सीडीआरआई अपने नए परिसर में नैशनल जीएलपी कंप्लाएंस मॉनीटरिंग अथॉरिटी अनुमोदित जीएलपी टेस्ट फैसिलिटी स्थापित करने के लिये वचनबद्ध है। इस उद्देश्य के लिये यह कार्यशाला सीएसआईआर-सीडीआरआई की जीएलपी टेस्ट फैसिलिटी को अधिकृत करने के लिये बड़ी सहायता प्रदान करेगी। इस प्रशिक्षण के समाप्त होने के पश्चात संस्थान शीघ्र ही प्रस्तावित टेस्ट फैसिलिटी के लिये NGCMA को आवेदन प्रस्तुत करेगी। नैशनल जीएलपी कम्प्लाएंस मॉनीटरिंग अथॉरिटी विकास एवं प्रौद्योगिकी प्रभाग नई दिल्ली की डा (श्रीमती) एकता कपूर, क्वॉलटॉक्स कंसल्टेन्सी बंगलुरू की कंसल्टेन्ट डा गीता राजशेखर और आईआईएससी बंगलुरु के डा एस जी रामचंद्रन ने गुड लेबोरेटरी प्रैक्टिस के विभिन्न पहलुओं पर चर्चा की जो अनुपालन हेतु आवश्यक हैं। व्याख्यानों के पश्चात् सभी प्रतिभागियों को जीएलपी कंप्लाएंस से परिचित कराने के लिये स्टडी प्लान/स्टडी रिपोर्ट पर विस्तार से चर्चा की गई।

सद्भावना दिवस समारोह

संस्थान में 19 अगस्त 2016 को सभी धर्मो भाषाओं और क्षेत्रों के लोगों में रा ट्रीय एकता और सांप्रदायिक सद्भावना की अभिवृद्धि के लिये ''सद्भावना दिवस का आयोजन किया गया। सद्भावना दिवस मनाने के पीछे उद्देश्य यह है कि हिंसा का परित्याग किया जाए और लोगों में मैत्री को बढावा दिया जाए। सीएसआईआर-सीडीआरआई के सभी कर्मचारियों ने इस अवसर में भाग लिया और सद्भावना की शपथ ली कि वे जाति, धर्म क्षेत्रा और भाषा के भेदभाव के बगैर भारत के सभी लोगों की भावनात्मक एकता और मैत्री के लिये कार्य करेगे।

औषधि खोज में हाई फील्ड एनएमआर स्पेक्ट्रोस्कोपी के प्रयोग पर राष्ट्रीय कार्यशाला

सीएसआईआर-सीडीआरआई में 24-26 अगस्त 2016 को ''ऐप्लिकेशन्स ऑफ हाई फील्ड एनएमआर स्पेक्ट्रोस्कोपी इन ड्रग डिस्कवरी'' (ANDD 2016) पर तीन दिवसीय रा ट्रीय कार्यशाला का आयोजन किया गया। कार्यशाला का उद्देश्य प्रतिभागियों को आधुनिकतम एनएमआर स्पेक्ट्रोमीटर्स पर प्रायोगिक अनुभव उपलब्ध करवा कर हाई एन्ड स्किल सेट का प्रशिक्षण देना है। निदेशक डॉ मधु दीक्षित ने कार्यशाला का उद्घाटन किया और अपने उद्घाटन भाषण में उन्होंने उच्च गुणवत्ता के अनुसंधान के लिये नई तकनीक सीखने और नए कौशल वृद्धि पर जोर दिया। उन्होंने कहा कि हाई फील्ड एनएमआर स्पेक्ट्रोस्कोपी को सीखना निश्चित रूप से औषधि विकास के लिये बहुत लाभदायक होगा। उन्होंने आशा व्यक्त की कि प्रतिभागी समृद्ध ज्ञान ओर अनुभव लेकर वापस जाएंगे। डॉ ब्रजेश कुमार ने देश के विभिन्न संस्थानों और विश्वविद्यालयों से अपने कौशल विकास के लिये आए हुए प्रतिभागियों का स्वागत किया। उन्होंने बताया कि सीएसआईआर-सीडीआरआई में विश्वस्तरीय एनएमआर सुविधाएं है और प्रतिभागी इस कार्यशाला से अधिकतम लाभ उठा सकते है। तकनीक के विभिन्न पहलुओं और उनके प्रयोग पर डॉ आशीष अरोड़ा, डॉ टी नरेन्द्र और डॉ संजीव के शुक्ला ने प्रतिभागियों को प्रशिक्षित किया।

''रीसेन्ट ट्रेण्ड्स इन ड्रग डिवेलपमेन्ट'' पर संगोष्ठी

''रीसेन्ट ट्रेण्ड्स इन ड्रग डिवेलपमेन्ट'' पर एक संगोष्ठी 26 अगस्त 2016 को सीएसआईआर-सीडीआरआई में संस्थान के चीफ साइंटिस्ट डॉ राकेश शुक्ला की लम्बी एवं समर्पित सेवाओं को सम्मानित करने के लिये आयोजित की गई। डा राकेश शुक्ला इसी महीने की 31 तारीख को सेवानिवृत्त हुये। डॉ मधु दीक्षित ने अतिथियों का स्वागत किया और दर्शकों के समक्ष हाल के वर्षो के औषधि विकास के परिदृश्य में परिवर्तनों पर चर्चा की।

सीएसआईआर-सीडीआरआई के भूतपूर्व निदेशक डॉ बीएन धवन ने संगोष्ठी की अध्यक्षता की। प्रख्यात वक्ताओं, मार्केटिंग ऐक्सेस ऐण्ड प्राइसिंग, नोवार्टिस, मुम्बई के डा वरुण गुप्ता, सीएसआईआर-सीडीआरआई, लखनऊ के भूतपूर्व वैज्ञानिक डा सी नाथ, केजीएमयू लखनऊ में न्यूरोलॉजी के प्रोफेसर प्रो राकेश शुक्ला, सीएसआईआर-सीडीआरआई के भू.पू. निदेशक प्रो बीएन धवन ने संगोष्ठी के दौरान श्रोताओं को संबोधित किया।

प्रमुख वैज्ञानिकों के संबोधन के पश्चात निदेशक डा मधु दीक्षित ने सीएसआईआर-सीडीआरआई के फार्माकॉलॉजी विभाग के मुख्य वैज्ञानिक एवं प्रभागाध्यक्ष डा राकेश शुक्ला को उनके द्वारा संस्थान को और विज्ञान को दीर्घ एवं समर्पित सेवाओं के लिये सम्मानित किया और सेवानिवृत्ति के पश्चात उनके खुशहाल और समृद्ध जीवन के लिये शुभकामनाएं दी।

सीएसआईआर प्लेटिनम जुबली स्थापना दिवस समारोह एवं सीडीआरआई सम्मान समारोह

28 सितंबरए 206 को सीएसआईआर प्लेटिनम जुबली स्थापना दिवस समारोह एवं सीडीआरआई सम्मान समारोह का आयोजन किया गया। इस शुभ अवसर पर निदेशक डॉ मधु दीक्षित ने अतिथियों का स्वागत किया और कहा की हमे सीएसआईआर का हिस्सा होने पर गर्व है जिसकी स्थापना 1942 मे की गई तथा जिसने विज्ञान एवं औद्योगिक विकास के साथ ही राष्ट्र निर्माण मे महत्वपूर्ण भागीदारी निभाई है। आजए सीएसआईआर विश्व के अग्रणी वैज्ञानिक एवं औद्योगिक अनुसंधान संस्थानो मे सम्मिलित है। शिमेगो संस्थानो की नवीनतम रेंकिंग के अनुसार सीएसआईआर शीर्ष 100 संस्थानो मे स्थान पाने वाला भारत का अकेला सरकारी संगठन है जिसका विश्व के शीर्ष सरकारी संगठनो मे 12वा स्थान है।

इस अवसर पर सीएसआईआर-सीसीएमबी हैदरबाद के विख्यात वैज्ञानिक और जेसी बोस फेलो, प्रोफ अमिताभ चट्टोपाध्याय ने मुख्य अतिथि के रूप मे कार्यक्रम की शोभा बढाई। प्रो अमिताभ ने कोलेस्ट्रॉल इन बायलोजी एंड मेडिसिन हिस्ट्री मिथ्स एंड एकसाइटमेंटस पर एक रोचक व्यख्यान दिया। उन्होने कहा कोलेस्ट्रॉल होस्ट सेल्स मे पेथोजेंस की बड़ी संख्या मे प्रवेश से संबन्धित है। उन्होने भारतीय संदर्भ मे बीमारियों पर जोर देने के साथ रोग प्रक्रियाओं मे कोलेस्ट्रॉल के विभिन्न परीक्षणों पर प्रकाश डालते हुए कहा कि कोलेस्ट्रोल की अधिकता एवं न्यूनता दोनों ही स्वास्थ्य के लिए घातक है।

सीएसआईआर-सीडीआरआई के पूर्व निदेशक डॉ वीपी कंबोज ने कार्यक्रम कि अध्यक्षता की। अपने अध्यक्षीय सम्बोधन मे उन्होने सीएसआईआर-सीडीआरआई को सुलभ स्वास्थ्य रक्षा के लिए उत्पादों और प्रोद्योगिकियों के संदर्भ मे उल्लेख्ट योगदान के लिए इस संस्थान को आदर्श बताया। इसके पश्चात मंच पर उपस्थित गणमान्य अतिथियों ने सीएसआईआर-सीडीआरआई समाचार पत्र खंड 8 अंक 1 का विमोचन किया।

सीडीआरआई सम्मान समारोह के दौरान औषधि अनुसंधान मे उत्कृष्ट अनुसंधान के लिए बायोलोजिकल साइन्सेज मे इंडियन इंस्टीट्यूट ऑफ साइन्सए बेंगलुरु के डॉ पेट्रिक डीसिल्वा को पुरस्कार प्रदान किया गया। डॉ पेट्रिक ने अपनी नवीन खोजए 'एंटी ऑक्सीडेंट नेनोजाइम थेरेप्युटिक्स अगेन्स्ट ओक्सीडेटिव स्ट्रेस रिलेटेड डिसओर्डेर्सश्' पर यह पुरस्कार दिया गया। अपने सम्बोधन मे उन्होने बताएए हेवी मेटल वेनेडियम से तैयार नेनोमटेरियल्स एंटीओक्सीडेंट एंजायम्स की तरह सक्रियता दिखा रहे हैं। इन नेनोवेयर्स के प्रयोग से ओक्सीडेटिव स्ट्रैस से संबन्धित परिस्थितियों मे रिएक्टिव ओक्सिजन के बेलेंस को बनाने मे मदद मिलेगी जिस से ओक्सीडेटिव स्ट्रैस से होने वाली बीमारियों की दशाओं मे लाभ मिलेगा।

औषधि अनुसंधान मे उल्लेख्ट अनुसंधान के लिए केमिकल साइन्सेज मे सीएसआईआर-आईआईसीटी हैदरबाद के डॉ एंथोनी एड्लागट्टा को उनके शोध कार्य 'ड्रग डिस्कवरी एफर्ट्स अगेन्स्ट एम-टीबी एंड मलेरिया एंजायम्स' के लिए दिया गया। अपने व्याख्यान मे उन्होने कहा की एम टीबी और मलेरिया सम्पूर्ण विश्व मे जानलेवा बीमारियों मे शीर्ष पर है। पिछले कुछ वर्षों से रोगाणुओं ने प्रचलित दवाओं के विरुद्ध प्रतिरोध विकसित कर लिया है जिस से अब वे उतनी प्रभावशाली नहीं रहीं। इसके लिए उनके रिसर्च ग्रुप ने कुछ नए एंजायम्स को चिन्हित किया है जो प्रोटीन डिग्रेडेशन के माध्यम से इस समस्या के समाधान मे सहायक होंगे। इसके लिए उन्होने एक इनहिबिटर लाइब्रेरी भी तैयार की है।

समारोह के दूसरे सत्र के दौरान अप्रान्ह मे सीएसआईआर की सेवा मे 25 वर्ष पूरे कर चुके सदस्यों को तथा सितंबर 2015 से अगस्त 2016 के मध्य सेवानिवृत्त हुये सहकर्मियों को स्मृति चिन्ह प्रदान किए गए। सीएसआईआर प्लेटिनम जुबली स्थापना दिवस समारोह के दौरान आयोजित किए गए चित्रकला, निबंध लेखन एवं क्विज प्रतियोगिताओं के विजेताओं को पुरस्कार प्रदान किए गए। श्री विनय त्रिपाठी के धन्यवाद प्रस्ताव के साथ सीएसआईआर प्लेटिनम जुबली स्थापना दिवस समारोह एवं सीडीआरआई सम्मान समारोह का समापन हुआ।

इंडियन इंटेरनेशनल साइंस फेस्टिवल (आईआईएसएफ-2016)

इंडियन इंटेरनेशनल साइंस फेस्टिवल आईआईएसएफ (2016), जो अपनी तरह का एक विशालतम वैज्ञानिक समारोह है, के एक पूर्ववर्ती कार्यक्रम के तहत सीएसआईआर-सीडीआरआई मे 11 नवंबर, 2016 को जानकीपुरम परिसर मे जन सामान्य के लिए 'ओपन डे' का आयोजन किया गया। औषधि अनुसंधान की जटिलताओं से परिचित कराने के लिए तथा जन सामान्य एवं छात्रों को संस्थान के अनुसंधान क्रियकलापों का अनुभव कराने तथा उपलब्धियों के बारे मे जानकारी देने के लिए इस कार्यक्रम का आयोजन किया गया।

ओपन डे के दौरान लखनऊ के 20 स्कूलों एवं 12 कालेजों के लगभग 1600 लोगों ने संस्थान का भ्रमण किया तथा परिष्कृत व अद्वितीय सुविधाओं के साथ साथ औषधि अनुसंधान की बेसिक कार्यप्रणाली को समझने के लिए वैज्ञानिकों के साथ बातचीत की।

प्रेक्षागृह परिसर मे संस्थान द्वारा विकसित प्रोद्योगिकियों, प्रक्रियाओं, तथा उत्पादों की एक प्रदर्शनी लगाई गई थी। सभी ने प्रदर्शनी का अवलोकन कर संस्थान के वैज्ञानिक योगदानों के संबंध मे जानकारी प्राप्त की।

स्कूली बच्चों के लिए विज्ञान के मॉडल एवं क्विज प्रतियोगिता का आयोजन किया गया। इन प्रतियोगिताओं मे 15 से अधिक स्कूलों के बच्चों ने भाग लिया।

रिसर्च स्कोलर्स के लिए 12वीं जे-नोस्ट कोन्फ्रेंस

शोध छात्रों के लिए 12वीं जे-नोस्ट कांफ्रेंस का आयोजन सीएसआईआर -सीडीआरआई में 24-27 नवम्बर, 2016 में किया गया। कांफ्रेंस का उद्घाटन सीएसआईआर-सीडीआरआई की निदेशक, डॉ मधु दीक्षित के स्वागत भाषण से हुआ। यूनिवर्सिटी ऑफ पेरोदेनिया, श्रीलंका के प्रोफेसर अनुरा विक्रमसिंघे तथा यूनिवर्सिटी ऑफ रेगेन्सवर्ग, जर्मनी के प्रोफेसर आंलिवर रोजर ने अतिथि व्याख्यान प्रस्तुत किए। इस चार दिवसीय संगोष्ठी के दौरान शोध पत्रों की लगभग 70 मौखिक प्रस्तुतियाँ हुई एवं लगभग 75 पोस्टर प्रस्तुत किए गए।

एचपीएलसी.एमएस द्वारा एनालिटिकल फायटोर्मास्युटिकल केमिस्ट्री पर राष्ट्रीय कार्यशाला

कौशल विकास कार्यक्रम में योगदान करते हुए सैफ, सीएसआईआर-सीडीआरआई ने हाई परफार्मेन्स लिक्विड क्रोमेटोग्राफी-मास स्पेक्ट्रोमीट्री द्वारा एनालिटिकल फाइटोफार्मास्युटिकल केमेस्ट्री पर एक पाँच दिवसीय राष्ट्रीय कार्यशाला का आयोजन 5-9 दिसम्बर, 2016 को किया। देश के विभिन्न क्षेत्रों से वैज्ञानिकों एवं अनुसंधानकर्त्ताओं ने एनालिटिकल फाइटोफार्मास्युटिकल केमिस्ट्री की आधुनिक तकनीकों को सीखा।

ग्रामीण अतिपिछड़ी बालिकाओं के लिए विशेष प्रशिक्षण एवं अभिप्रेरण कार्यक्रम

सीएसआईआर-सीडीआरआई एवं सर्वशिक्षा अभियान उत्तरप्रदेश तथा केयर इंडिया (एनजीओ) के संयुक्त तत्वाधान में दिनांक 9-13 जनवरी, 2016 को सीडीआरआई मे कस्तूरबा गांधी बालिका विद्यालय, जरबल, बहराइच की 15 चयनित छात्राओं के लिए एक पाँच दिवसीय विशेष प्रशिक्षण एवं अभिप्रेरण कार्यक्रम का आयोजन किया गया। यह कार्यक्रम छात्राओं को विज्ञान एवं स्वास्थ के क्षेत्र नई प्रेरणा एवं नई सोच देने के उद्देश्य से किया गया था जो उनके साथ साथ उनके परिवार एवं सामाजिक परिवेश को भी एक नई दिशा प्रदान करने मे महत्वपूर्ण भूमिका निभाएगा।

लाइफ साइन्सेज में ट्रांसमिशन इलेक्ट्रॉन माइक्रोस्कोप के अनुप्रयोगों पर राष्ट्रीय कार्यशाला

मानव संसाधन विकास, जो कि किसी भी संस्थान के कर्मचारियों के ज्ञान, कौशल, शिक्षा एवं योग्यता के सतत् विकास की प्रक्रिया है, इस तथ्य की आवश्यकता एवं महत्व को ध्यान में रखते हुए, लाइफ साइंसेज में ट्रांसमिशन इलेक्ट्रॉन माइक्रोस्कोप के अनुप्रयोगों पर एक राष्ट्रीय कार्यशाला का आयोजन सीएसआईआर-सीडीआरआई में 23-25 जनवरी, 2017 को किया गया। वैज्ञानिक तथा शोध छात्रों ने इसकी आधुनिक तकनीकों की जानकारी ली तथा अपने नमूनों की जांच द्वारा माइक्रोस्कोप की कार्यकुशलता का मूल्यांकन किया।

15वा बी मुखर्जी स्मृति व्याख्यान

संस्थान के प्रथम भारतीय निदेशक ड विष्णुपाद मुखर्जी की स्मृति में सीएसआईआर-सीडीआरआई ने 15वे बी मुखर्जी स्मृति व्याख्यान का आयोजन किया। अतिथियों का स्वागत करने के साथ ही अपने स्वागत भाषण मे निदेशक डॉ मधु दीक्षित ने कहाए डॉ मुखर्जी अपने समर्पण, विजन और कार्यकुशलता के लिए याद किए जाते हैं जिससे संस्थान के मिशन को अपने विकास कालीन चरण में ही एक विशिष्ट आकार प्राप्त हुआ। डॉ मुखर्जी ने स्वतंत्र भारत में औषधि खोज की आधारशिला रखी और औषधि निर्माण विज्ञान मे अपनी रुचि और अनुभवों से राजनेतिक नेतृत्व के समर्थन से सीडीआरआई को गढ़ा।

ग्लोबल हेल्थ एंड इन्नोवशन, सन फार्मा के वरिष्ठ सलाहकार एवं सीडीआरआई के पूर्व छात्र, डॉ अलताफ लाल ने यहाँ के अनुभवों को साझा करने के साथ ही बी मुखर्जी स्मृति व्याख्यान मे शोध संस्थानो एवं इंडस्ट्री के साथ मिल कर कार्य करने पर जोर देते हुए कहा, औषधि निर्माण उद्योग के साथ सहयोग का इस संस्थान का एक व्यापक एवं उपयोगी इतिहास रहा है। अब इस बात पर सभी एकमत हैं कि जीनोमिक्स, प्रोटियोमिक्स, स्टेम-सेल रिसर्च, सिस्टम्स बायोलॉजी इत्यादि मे आधुनिक विज्ञान मे तरक्की द्वारा नए और उन्नत चिकित्सकीय उत्पादों को विकसित करने के लिए उद्योग जगत और सरकारी उपक्रम जिनमे शिक्षण सस्थाएं, अनुसंधान संस्थाएं एवं नियामक एजेंसीज भी सम्मिलित हैं, के एक साथ और सकेंद्रित सहयोग की अवश्यकता है। इसी प्रकार क्लीनिकल परीक्षणों हेतु वास्तविक रोग-भार एवं रोग व्यापकता के निर्धारण के लिए बायोमेडिकल अनुसंधानकर्ताओं, एपिडेमियोलोजिस्टए क्लीनिकल साइंटिस्ट, जनस्वास्थ्य कार्यकर्ताओं के मध्य सहयोग आवश्यक है साथ ही समन्वय हेतु आवश्यक नीतिगत स्तरों पर वचनबद्धता की भी महती अवश्यकता है।

अपने अध्यक्षीय भाषण मे सीएसआईआर-सीडीआरआई के पूर्व निदेशक पद्मश्री डॉ नित्यानन्द ने डॉ मुखर्जी के संगठनात्मक कौशल, दूर दृष्टि के माध्यम से सीडीआरआई को औषधि अनुसंधान पर अग्रणी केंद्र का दर्जा दिलवाने मे उनके योगदान की सराहना की साथ ही डॉ अलताफ लाल के विचारों का स्वागत करते हुए उनके उद्योग एवं अन्य शोध संस्थानो के साथ मिलकर कार्य करने की आवश्यकता का समर्थन किया।

कार्यक्रम का समापन मुख्य अतिथि को स्मृति चिन्ह प्रदान करने तथा संस्थान के चीफ साइंटिस्टए डॉ ए के द्विवेदी के धन्यवाद प्रस्ताव से हुआ।

सामाजिक क्रियाकलाप

छात्रा अभिप्रेरणा कार्यक्रम

रिपोर्टिंग अवधि में शिक्षा में प्रयोग और नवीनता को प्रोन्नत करने के लिये और सामाजिक प्रभाव के संदर्भ में संस्थान की प्रासंगिकता के बारे में छात्रों के लिये अभिप्रेरणा कार्यक्रमों का आयोजन किया गया। इस कार्यक्रम के अंतर्गत को एस आर ग्रुप ऑफ इंस्टीट्यूशन्स, लखनऊ (6 अप्रैल 2016), विद्याज्ञान स्कूल, सीतापुर (5 जुलाई, 2016), को लखनऊ पब्लिक कॉलेज (28 जुलाई 2016), सागर पब्लिक स्कूल, भोपाल (27 सितम्बर, 2016), भवदीय इन्स्टीट्यूट ऑफ फार्मास्युटिकल साइंसेज एण्ड रिसर्च, फैजाबाद (29 सितम्बर, 2016) एमपी सी एस टी, भोपाल (20 अक्टूबर, 2016), अवध इण्टरनेशनल स्कूल, फैजाबाद (04 नवम्बर, 2016), डिपार्टमेंट ऑफ जूलॉजी, यूनिवर्सिटी ऑफ नार्थ बंगाल, सिलीगुड़ी, दार्जिलिंग (16 नवम्बर, 2016) एवं सैनिक स्कूल रीवा, म.प्र. (13 दिसम्बर, 2016) ने भाग लिया। कार्यक्रम का उद्देश्य विज्ञान में अपना करियर बनाने की कोशिश करने के लिये उनको प्रेरित करना और औषधि खोज एवं अनुसंधान संबंधी ज्ञान का अर्जन करना है। छात्रों ने अपने शिक्षकों के साथ विभिन्न प्रयोगशालाओं का भ्रमण किया और प्रयोगशाला के दैनिक कार्यो और प्रयोगों का अनुभव प्राप्त किया तथा वैज्ञानिकों से बातचीत की।

स्वास्थ्य जागरुकता कार्यक्रम

''सबके लिये सुलभ स्वास्थ्य के आदर्श वाक्य के साथ सीएसआईआर- सीडीआरआई में उत्पन्न जानकारी द्वारा स्वस्थ भारत सशक्त भारत मिशन के माध्यम से ग्रामीण भारत में स्वास्थ्य एवं विज्ञान की ओर जागरूकता उत्पन्न करके भारत सरकार के वर्तमान समय में चल रहे रा ट्रीय स्वास्थ्य कार्यक्रम को क्रियान्वित करने में मजबूती प्रदान की जा सकती है। इस उद्देश्य को पूरा करने के लिये सीएसआईआर- सीडीआरआई, लखनऊ अपने मेंडेट के अनुसार स्वास्थ्य से संबंधित विभिन्न बीमारियों के क्षेत्रों में गांवों में समय-समय पर स्वास्थ्य जागरूकता कार्यक्रमों को आयोजित करता है। इस अनुक्रम में डा संजीव यादव एवं डा अनिल गायकवाड़ के नेतृत्व में 10 सदस्यों के एक ग्रुप ने डायबिटीज़ पर एक स्वास्थ्य जागरूकता कार्यक्रम का आयोजन

जूनियर हाईस्कूल ग्राम कठवारा, तहसील बक्शी का तालाब, जिला लखनऊ में 2 मई 2016 को किया। इस जागरूकता कार्यक्रम में लगभग 200 लोगों ने भाग लिया। इस संकुल के अन्तर्गत 22 विद्यालयों के छात्रों उनके माता पिता और अध्यापकों ने भाग लिया और बीमारी की जानकारी प्राप्त करने का लाभ उठाया। इसी क्रम में वैज्ञानिकों की एक अन्य टीम जिसमें डा. शरद शर्मा, अनिल गायकवाड़, अखिलेश ताम्रकार और संजीव यादव और शोध छात्रा सम्मिलित थे द्वारा डायबिटीज और ब्लड प्रेशर पर एक अन्य स्वास्थ्य जागरूकता कार्यक्रम का आयोजन जूनियर हाईस्कूल ग्राम सिंघामऊ, जिला लखनऊ में 26 जुलाई 2016 को किया गया। 250 से अधिक प्रतिभागी जिनमें छात्रा उनके माता-पिता और अध्यापक शामिल थे इस कार्यक्रम में सम्मिलित हुए।

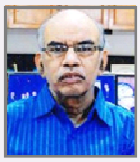
विभिन्न समारोहों एवं प्रदर्शनियों में संस्थान की उपलब्धियों की प्रदर्शनी

विज्ञान को समाज से जोड़ने के अपने प्रयासों के तहत, सीएसआईआर-सीडीआरआई ने अपनी अनुसंधान एवं विकास की उपलब्धियों तथा अपने अनुसंधान उत्पादों का प्रदर्शन विभिन्न समारोहों एवं प्रदर्शनियों में किया। संस्थान ने वाराणसी में स्वदेशी मेला (6-15 जनवरी, 2016), रीजनल साइंस सिटी, लखनऊ में 7वीं साइंस एक्सपो (7-9 फरवरी, 2016), नेशनल फेमिली प्लानिंग समिट-2016 (न्यू व्वाइस, न्यू होराइजन्स), स्वास्थ व परिवार कल्याण मंत्रालय, भारत सरकार द्वारा आयोजित (4-5 अप्रैल 2016), आईएफआईए द्वारा जीबीआईईसी, बैंगलुरू द्वारा आयोजित इंडिया इण्टरनेशनल इन्नोवेशन फेयर (9-12 सितम्बर, 2016), सिटी मांटेसरी स्कूल, गोमती नगर, लखनऊ द्वारा आयोजित जिला स्तरीय विज्ञान प्रदर्शनी (22 अक्टूबर, 2016), इंडिया इण्टरनेशनल ट्रेड फेयर-2016 प्रगति मैदान, नई दिल्ली में सीएसआईआर की जेनेरिक एवं हेल्थकेयर पवेलियन (13-27, नवम्बर, 2016), इंडिया इण्टरनेशनल साइंस फेक्टिवल (आईआईएसएफ-2016), एनपीएल, नई दिल्ली में हेल्थ केयर पवोलियन में (07-11 दिसम्बर, 2016), 104वीं इंडियन साइंस कांग्रेस एक्जिविशन, श्री वेन्कटेश्वरा यूनिवर्सिटी, तिरूपति (3-7 जनवरी, 2017) तथा सीएसआईआर-सीमैप, लखनऊ में किसान मेला (31 जनवरी, 2017) आदि में भाग लिया। इन समारोहों एवं प्रदर्शनियों में बहुत अधिक संख्या में गणमान्य लोगों, छात्रों, एवं जन सामान्य ने देश के कोने-कोने से आकार संस्थान की उपलब्धियों के बारे में जानकारी प्राप्त की।

प्रतिष्ठित अतिथि

	अतिथि	व्याख्यान का शीर्षक	दिनांक
	**डॉ वर्दराजन सुन्दरमूर्ति,** नेशनल सेंटर फार बायलोजिकल साइन्सेज, बंगलुरू	टार्गेटिंग होस्ट पाथवेज टू फाइट इंटरा-सेल्यूलर पैथोजेंस	19.02.2016
	**प्रो लुट्ज़ अकेर्मन्न** जिओर्ज़-अगस्त-यूनिवेर्सितेत गोटिङ्ग्जेन, जर्मनी	कैटालिटिक फंक्शनालाइजेशन ऑफ अन एकटीवेटेड सी-एच बॉड्स	24.02.2016
	**डेविड ए. विंक जूनि.** सेंटर फॉर कॅन्सर रिसर्च, नेशनल कैंसर इन्स्टीट्यूट, फ्रेडरि, एमडी, यूएसए	नाइट्रिक ऑक्साइड इन कार्डियोवैस्कुलर डिजीज एण्ड कैंसर	29.02.2016
	**प्रो सुब्रत घोष** डिपार्टमेंट ऑफ़ आर्गेनिक केमिस्ट्री इंडियन एसोसिएशन फॉर द कल्टीवेशन ऑफ़ साइंस, कोलकाता	ओलेपिफन मेटाथिसिस इन नेचुरल प्रोडेक्ट सिंथेसिस	7.03.2016
	**डॉ अरूण कुमार हालदर** डिपार्टमेंट ऑफ़ मॉलिक्यूलर जेनेटिक्स एण्ड माइक्रोबायोलॉजी एण्ड इम्युनोलोजी, ड्यूक यूनिवर्सिटी मेडिकल सेंटर, डरहम, एनसी, यूएसए	द मॉलिक्यूलर ''किश ऑफ़ डेथ'' : फाइंडिंग द एनिमी विदइन-हाउ सेल्स रेकॉग्नाइज़ एंड रेस्पोंड टु ए माइक्रोबियल पैथोजन हिडन इन ए वैकओल	10.03.2016
	**डॉ पंकज सेठ** मॉलिक्यूलर एण्ड सेलुलर न्यूरोसाइंस न्यूरोवायरोंलाजी सेक्शन, नेशनल ब्रेन रिसर्च सेंटर मानेसर, हरियाणा	ए नावेल मॉडल सिस्टम टु स्टडी गिल्यान्यूरोनल इंटरनेक्शन	11.03.2016
	**डॉ विनय गुप्ता** डिपार्टमेंट ऑफ़ पब्लिक हेल्थ डेंसिटी फेकल्टि ऑफ डेंटल साइंसेज (केजीएमयू)	इंपोर्टेन्स ऑफ़ ओरल हेल्थ इन डायबिटीज़	07.04.2016
	**प्रो कानूरी वी.एस.राव** ड्रग डिस्कवरी रिसर्च सेंटर ट्रांसलेशनल हेल्थ साइंस एण्ड टेक्नोलॉली इंस्टीर्टयूट, फरीदाबाद	डिफेरिंग थे द होस्ट-पैथोजन इंटरपले इन हयूमन मैक्रोफेगेज़ इन्फेक्टेड विथ *माइकोवेक्टीरियम ट्यूबरक्लोसिस*	11.04.2016
	**डॉ रिचर्ड केली** मैनेजिंग एडिटर, आर्गेनिक एण्ड बियोमोलेक्युलर केमिस्ट्री, मेडचेम्कम, मॉलिक्यूलर बायोसिस्टम्स एण्ड नेचुरल प्रोडक्ट रिपोर्ट्स	रॉयल सोसाइटी ऑफ़ केमिस्ट्री-अब्डेट्स एण्ड रीसेंट स्टेटिस्टिक्स, पियर रिव्यु एण्ड फ्यू टिप्स अबाउट मैनुस्क्रिप्ट राइटिंग	12.04.2016

	**डॉ. भावना पाराशर** सीएसआईआर-आईजीआईबी, नई दिल्ली	थेरेप्युटिक आस्पेक्ट्स ऑफ़ आयुर्वेद फॉर ट्रांसनेशनल ऑउटकम्सः लीडस् फ्रॉम अयुर्जीनोमिक्स स्टडी	12.04.2016
	**डॉ एस के माथुर** एंडोक्राइनोलॉजी डिवीज़न एसएमएस मेडिकल कॉलेज, जयपुर	मॉलिक्यूलर मैकेनिजम ऑफ़ एशियन इंडियन डाबेटस	27.04.2016
	**डॉ उदय सक्सेना** मेंटर, रेड्डीज इंस्ट्टीयूट ऑफ़ लाइफ साइंसेज	हाउ आर न्यू मेडिसिन्स डिस्कोवर्ड-जर्नी फ्रॉम बेंच टू बेडसाइड	05.05.2016
	**प्रो. राम एस वर्मा** डिपार्टमेंट ऑफ बायोटेक्नोलॉजी इंडियन इंस्टिट्यूट ऑफ़ टेक्नोलॉजी, मद्रास	माइक्रोअरे एनालिसिस ऑफ फांकनी एनीमिया पेशेंट्स एण्ड आइडेंटिफिकेशन ऑफ़ डिसरेगुलेटेड पाथवेज इन इंडियन पापुलेशन	12.07.2016
	**प्रो. संदीप वर्मा** डिपार्टमेंट ऑफ़ केमिस्ट्री, इंडियन इंस्टिट्यूट ऑफ़ टेक्नोलॉजी, कानपुर	अप्रोअचएस फॉर नाइट्रिक ऑक्साइड रिलीज़ न्यूरोनल रेजेंरेशन एण्ड इन्हीबिशन ऑफ़ इन्सुलिन एग्रीगेशन	20.07.2016
	**प्रो. सूर्य कांत त्रिपाठी** डिपार्टमेंट ऑफ़ पल्मोनरी मेडिसिन, (केजीएमयू), लखनऊ	ट्यूबरक्लोसिसः एन ओवरव्यू एण्ड क्लीनिशियन्स पर्सपेक्टिव फॉर टीबी रिसर्च	28.07.2016
	**प्रो. दीवान सिंह** डिपार्टमेंट ऑफ़ केमिस्ट्री, दिल्ली यूनिवर्सिटी, दिल्ली	मॉलिक्यूलर हयब्रिडसः इनोवेटिव एप्रोच ऑफ़ ड्रग डिजाईन	24.08.2016
	**डॉ. जीन-पियरे मेजोरल,** डायरेक्टर ऑफ़ रिसर्च एक्सेप्शनल क्लास, एमेरिटस मेंबर ऑफ़ द यूरोपियन अकादमी, पोलिश एण्ड जर्मन (गोटिंजेन) एकेडमीज ऑफ़ साइंसेज	डिजाईन एण्ड ऍप्लिकेशन्स ऑफ़ फॉस्फोरस डेनड्रीमर्स इन नैनोमेडिसिन	15.09.2016
	**प्रो. सर्ज मिगनानी** फार्मर हेड ऑफ मेडिसिनल केमिस्ट्री डिपार्टमेंट एण्ड साइंटिफिक डायरेक्टर (सनोफी) यूनिवर्सिटी पेरिस डेसकारटेस, फ्रांस	नॅनोटेक्नोलॉगीज इन जनरल एण्ड फॉस्फोरस डेनड्रीमर्स इन पर्टिक्युलर टु ट्रीट कैंसरस, करंट सिचुएशन एण्ड नेक्स्ट स्टेप्स	15.09.2016
	**डॉ एनुगंति वैंगला राव** लाइब्निज़ इंस्टिट्यूट फॉर फार्म एनिमल बायोलॉजी, जर्मनी	ओवेरियन सेल फंक्शन ड्यूरिंग डिफरेंट पैथो फिजिओलोजिकल कंडीशन	17.11.2016

	**डॉ. अमित कुमार मित्रा** यूनिवर्सिटी ऑफ़ मिनेसोटा, यूएसए	सिंगल-सेल एनालिसिस ऑफ टार्गेटेड ट्रांस्क्रिप्टो प्रेडिक्टस ड्रग सेंसिटिविटी इफ इंडिविजुअल सेल्स विथिन हयूमन मायलोमा ट्यूमर्स	1.12.2016
	**डॉ संदीप दुगड़,** स्फीरा फ़ार्मा, सिंगापुर	अ कॉलेबोरेटिव एप्रोच ऑफ़ ट्रांसलेटिंग साइंस टु मेडिसिन्सः पार्टनरशिप बिटवीन इंडस्ट्री एण्ड रिसर्च इंस्टीट्यूट	05.12.2016
	**श्री विकास सारस्वत,** सारस्वत एण्ड कम्पनी, नई दिल्ली	एन इंटेरेक्टिव सेशन इन आईपीआर	06.12.2016
	**डॉ यू डी गुप्ता,** नेशनल जालमा इन्स्टिट्यूट ऑफ लेप्रोसी एण्ड अदर माइक्रोबेक्टीरियल डिसीजेस, आगरा	ए म्यूरीन मोडल ऑफ टीबी मेंनेजाइटिस	17.01.2017
	**डॉ. पापरी बनर्जी,** बायो-इनोवेशन एण्ड एन्त्रप्रेन्योर्शिप फ्रॉम सेंटर फॉर सेल्युलर एण्ड मॉलेक्युलर प्लॅटफार्म्स (सी-केम्प), बैंगलुरू	बिराक बिग स्कीम-10 वी कॉल, सी-केम्प ए बिग पार्टनेर	31.01.2017

संस्थान के वैज्ञानिकों द्वारा दिये व्याख्यान

डॉ. अनुराधा दुबे

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डॉ. शैलजा भट्टाचार्य

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डॉ. अशीम घटक

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डॉ. ए. के. द्विवेदी

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डॉ. नीना गोयल

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डॉ. आर. के. सिंह

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डॉ. बृजेश कुमार

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डॉ. कल्याण मित्रा

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डॉ. अतुल गोयल

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डॉ. संजय बत्रा

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डॉ. गौतम पाँडा

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डॉ. टी. नरेन्दर

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डॉ. किशोर मोहनन

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डॉ. नम्रता रस्तोगी

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डॉ. अरूण के त्रिवेदी

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डॉ. के. आर. आर्या

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डॉ. सतीश मिश्रा

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डॉ. मृगांक श्रीवास्तव

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डॉ. विवेक मोसले

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डॉ. वहाजुद्दीन

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डॉ. कुमार वेलु जगवेलु

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डॉ. प्रेम एन यादव

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डॉ. राजेन्द्र सिंह

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डॉ. मोनिका सचदेव

- कैन डिसफ़ंक्शनल गोनैड्स बी. रिजुविनेटेड थ्रू स्टेम सेल थेरेपी? नेशनल ट्रेनिंग प्रोग्राम रीसेन्ट एडवान्सेज़ इन फ़िश रिप्रोडक्टिव बायोटेक्नोलॉजी फ़ॉर प्रॉपेगेशन ऑफ़ एनडेनजर्ड स्पीशीज; ऑर्गनाइज्ड बाइ आई सी ए आर - नेशनल ब्यूरो ऑफ़ फ़िश जेनेटिक रिसोर्सेज, लखनऊ, जुलाई 2016।

डॉ. राजेश कुमार झा

- रिसेप्टिव इण्डोमीट्रियम कैन यूटिलाइज़ इन्टोग्रीन बीटा 8 इन्ड्यूज्ड FAK एण्ड Vav-Rac1 सिंगनलिंग ड्यूरिंग एम्ब्रेयो इम्प्लांटेशन प्रॉसेसेज, 34जी ऐनुअल मीटिंग ऑफ़ द सोसाइटी फ़ॉर री प्रोडक्टिव बायोलॉजी एण्ड कम्पेरेटिव एण्डोक्राइनोलॉजी एण्ड ऐन इण्टरनेशनल सिम्पोज़ियम ऑन इन्टीग्रेटिव फ़िज़ियोलॉजी एण्ड कम्पेरेटिव एण्डोक्राइनोलॉजी (ISIPCE) ऐट डिपार्टमेंट ऑफ़ जू ऑलॉजी बनारस हिन्दू यूनिवर्सिटी, वाराणसी, 12-14 फरवरी, 2016।
- स्पॉन्सर्ड शॉर्ट कोर्स एन्टाइटल्ड, 'ऑप्टिमाइजिंग फ़र्टिलिटी इन लाइव स्टॉक ऑफ हिल ईकोसिस्टम अप्लाइंग माडर्न एप्रोचेज नेशनल रिसर्च सेन्टर ऑन याक, दिरांग, वेस्ट थामेंग डिस्ट्रिक्ट, अरूणांचल प्रदेश - 790101, 22-31 अगस्त 2016।

डॉ. भूपेन्द्र एन सिंह

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डॉ. अतुल कुमार

- इमर्जिंग ट्रेण्ड्स इन ट्रांसलेशनल रिसर्च इन इण्डिया : डिजाइन एण्ड सिंथिसिज़ ऑफ़ एण्टीकैंसर एजेण्ट्स, शिवनादर यूनिवर्सिटी, अप्रैल 09, 2016।

डॉ. संजीव के शुक्ला

- एन एन आर बेस्ड मेटाबोलोमिक्स टु स्टडी द टिश्यू स्पेसिफ़िसिटी एण्ड सीज़नल वैरिएशंस इन ऐल्सटोनिया स्कॉलैरिस 22दक ैष्ठ इण्टरनेशनल कांफ्रेंस (ISC BC-2016) ऐट यूका तरसेडिया यूनिवर्सिटी, सूरत 6-8 फरवरी, 2016।
- ऐप्लिकेशंस ऑफ़ एन एम आर स्पेक्ट्रोक्कोपी फ़ॉर स्ट्रक्चरल कैरेक्टराइज़ेशन, नेशनल वर्कशॉप एंट जी एल ए यूनिवर्सिटी मथुरा, 29 अप्रैल, 2016।
- एन एम आर स्पेक्ट्रोस्कोपी : ऐन ओवर व्यू ड्यूरिंग डिस्टिंग्विश्ड लेक्चर सिरीज़ ऐट DSMNR यूनिवर्सिटी, लखनऊ 3 अगस्त, 2016।
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डॉ. आर. के. त्रिपाठी

- रीसेन्ट एडवान्सेज़ इन HIV/AIDS ड्रग डिस्कवरी एण्ड डिवलप्मेंट क्लसलिंगम यूनिवर्सिटी, कृष्ननकांइल 27 दिसम्बर 2016।

डॉ. एस. आर. कुलकर्णी

- वेरिअस मेकैनिज़म्स ऑफ IP प्रोटेक्शन, इन्टेग्रल यूनिवर्सिटी लखनऊ 3 अप्रैल 2016।

विदेश यात्राएँ/प्रतिनियुक्तियाँ

वैज्ञानिक का नाम	देश	यात्रा का उद्देश्य (प्रतिन्युक्ति की अवधि)
श्री सुमन कुमार मलिक	वियतनाम	विली एशिया-पेसिफिक लाइब्रेरी अड्वाइसरी कमिटी मीटिंग मे भाग लेने (24 मई, 2016)
डॉ समन हबीब	फ्रांस	द इंटरनॅशनल ह्यूमन फ्रॉटियर साइन्स प्रोग्राम ऑर्गनाइज़ेशन की फेलोशिप रिव्यू कमिटी मीटिंग में भाग लेने (18-20 जनवरी 2016)
	फ्रांस	द इंटरनॅशनल ह्यूमन फ्रॉटियर साइन्स प्रोग्राम ऑर्गनाइज़ेशन की फेलोशिप रिव्यू कमिटी मीटिंग में भाग लेने (23-25 जनवरी, 2017)
डॉ नीना गोयल	ग्रीस	एन्यूअल मीटिंग ऑफ प्रॉजेक्ट न्यू मेडिसिन्स फॉर ईयू-एफपी7 ट्राइपेनोसोमटिडिक इन्फेक्संस (एनएमट्रप1) कन्सोर्टियम (14-16 नवंबर 2016)
डॉ अतुल गोयल	ताइवान	इंटेरनेशनल कोंफ्रेंस ऑन मटेरियल्स इंजीनियरिंग एंड नेनोटेक्नोलोजी में भाग लेने (21-24 मई 2016)
	हाँग काँग	डिपार्टमेन्ट ऑफ केमिस्ट्री, हाँग काँग यूनिवर्सिटि की फेकल्टीज से इंटेरक्शन करने एवं व्याख्यान देने हेतु (26 मई 2016)
डॉ मोहम्मद इमरान सिद्दीकी	इटली	कांफ्रेंस ऑन जीनोम आर्किटेक्चर इन स्पेस एंड टाइम में भाग लेने (20-24 जून, 2016)
डॉ राजेंद्र सिंह	यूएसए	एसईआरबी एवं इंडो-यूएस साइन्स एंड टेक्नॉलॉजी फोरम (आईयूएसएसटीएफ) के तहत अनुसंधान हेतु (23 जनवरी 2017-22 जनवरी 2018)
डॉ अमीर नाज़िर	जर्मनी	अल्बर्ट ल्युइडविग यूनिवर्सिटी अ फ फ्रीबर्ग में शोध कार्य हेतु (10 मार्च -09 जुलाई 2016)
डॉ स्मृति भदोरिया	जर्मनी	यूनिवर्सिटी ऑफ लीपजिंग, लीपजिंग, जर्मनी में आईएनएसए, इंटरनेशनल कोलेब्रेशन/एक्सचेंज प्रोग्राम के तहत शोध कार्य हेतु (16 जून-13 सितम्बर 2016)
डॉ अखिलेश कुमार तामकार	कनाडा	डिपार्टमेन्ट ऑफ बायोकेमिस्ट्री एंड बायोमेडिकल साइन्स, मेक मास्टर यूनिवर्सिटी, हेमिल्टन में शोध कार्य हेतु (08 दिसम्बर - 07 जून 2017)
डॉ सिद्धार्थ चोपड़ा	यूके	चेवेनिंग रॉल्स रोएस साइन्स, इन्नोवेशन एंड लीडरशिप फेलोशिप (सीआरआईएसपी) के तहत शोध कार्य हेतु (13 अप्रेल-24 जून, 2016)
डॉ कुमारवेलु जगवेलु	जर्मनी	एक्सचेंज ऑफ एक्सपीरिएन्स ग्लोबल बायोइमेजिंग वर्कशॉप भाग लेने हेतु (8-14 जून, 2016)
डॉ वहाजुद्दीन	फ्रांस	ट्वास बायोविजन इंटेरनेशनल कोंफ्रेंस में भाग लेने (12-14 अप्रैल 2016)
	कनाडा	आईयूबीएमबी 2016 कोंफ्रेंस में भाग लेने (17-21-जुलाई, 2016)

विशिष्ट वैज्ञानिक समितियों की सदस्यता

डॉ मधु दीक्षित

सदस्यः 1. काउन्सिल आफ इंडियन अकेडमी ऑफ साइंसेज 2. सेक्शनल कमेटी (हेल्थ साइंसेज) इंडियन नेशनल साइंस अकेडमी 3. अकेडमी काउंसिल, जवाहर लाल नेहरू यूनिवर्सिटी, नई दिल्ली 4. कोर मेम्बर, प्रोग्राम एडवायजरी कमेटी आन हेल्थ साइंसेज, एसइआरबी, डीएसटी 5. साइंटिफिक एडवायजरी कमेटी (एसएसी), डीबीटी-आईआईएससी पार्टनरशिप प्रोग्राम 6. नेशनल रिसर्च एडवायजरी कमेटी मीटिंग ऑफ नेशनल इन्नोवेशन फाउन्डेशन-इंडिया, अहमदाबाद 7. स्टीयरिंग कमेटी ऑफ नायपर्स, डिपार्टमेन्ट ऑफ फार्मास्यूटिकल्स, मिनिस्ट्री ऑफ केमिकल्स एण्ड फर्टिलाइजर्स 8. इंडियन काउंसिल ऑफ मेडिकल रिसर्च पीएसी 9. सीएसआईआर (आर्गेनिक एण्ड मेडिसिनल केमिस्ट्री एण्ड केमिकल टेक्नोलाजी रिसर्च कमेटी) 10. ड्रग टेक्निकल एडवायजरी बोर्ड, डायरेक्टोरेट जनरल ऑफ हेल्थ सर्विसेज, डीसीजीआई, इंडिया 11. इंस्टीट्यूट बाडी आफ एसजीपीजीआई, लखनऊ (2015-2019) 12. एक्सपर्ट कमेटी ऑन मलेरिया डायग्नास्टिक एण्ड कोमोथेरपी एण्ड प्रोस्पेक्ट्स ऑफ मलेरिया इलिमिनेश्न इन द कंट्री 13. एडवायज री-कम-मानिटरिंग कमेटी ऑफ बायोटेक पार्क लखनऊ (2015-17) 14. आर्गेनिक केमिकल्स, एल्कोहल्स एण्ड एलाइड प्राडक्ट्स सेक्शनल कमेटी, पीसीडी 09, ब्यूरो आफ इंडियन स्टेण्डर्ड्स, नई दिल्ली 15. एकेडेमी स्टेण्डर्ड कमेटी नाइपर 16. लखनऊ मेनेजमेण्ट असोसिएशन

सदस्य सोयटीजः 1. इंडियन सोसायटी ऑफ फ्री रेडिकल रिसर्च 2. इंटरनेशनल सोसायटी ऑफ हार्ट रिसर्च (इंडियन सेक्शन) 3. इंडियन फार्माकोलाजिकल सोसायटी 4 सोसायटी आफ बायलोजिकल केमिस्ट्स 5. इंडियन अकेडमी आफ न्यूरो साइंसेस, इंडिया 6. यूपी असोसिएश्न आफ साइंस एण्ड टेक्नोलाजी 7. नेशनल अकेडमी आफ मेडिकल साइंसेस, इंडिया 8. द सायटोमीट्रि सोसायटी आफ इंडिया 9. इंडियन सोसायटी फार एथरोस्कलेरोसिस रिसर्च 10. पल्मोनरी वैस्कुलर रिसर्च इंस्टिट्यूट, इंडिया 11. नेशनल अकेडमी ऑफ साइंसेज, इंडिया 12. इंडियन अकेडमी ऑफ साइंसेज

डॉ असीम घटक

सदस्य : 1. अमेरिकन कॉलेज ऑफ क्लीनिकल फार्माकोलाजी, (एमएसीसीपी), द प्रीमियर अकादमिक बॉडी ऑफ क्लीनिकल फार्माकोलॉजी ऑफ क्लीनिकल फार्माकोलॉजी ऑफ यूएसए 2. द नेशनल अकादमी ऑफ मेडिकल साइंसेज (MNAMS) द मोस्ट प्रीमियर अकादमिक बॉडी ऑफ मेडिकल साइंसेज इन इंडिया (3) सीएसआईआर आरए बी कोर कमेटी मेंबर फॉर सिलेक्शन कमेटी फॉर साइंटिस्ट रिक्रूटमेंट ऐट सीएसआरआई-आईआईसीबी कोल्कता

इलेक्टेड कौंसिलरः एग्जीक्यूटिव कमेटी ऑफ साउथ एशियन चौप्टर ऑफ अमेरिकन कॉलेज ऑफ क्लीनिकल फार्माकोलॉजी, मुम्बई, इंडिया 2015-2016

फेलो : द इंडियन कॉलेज ऑफ फिजिशियन्स (एफआइसीपी) द अकादमिक बॉडी ऑफ एसोसिएशन ऑफ फिजिशियन्स ऑफ इंडिया (एपीआइ)

डॉ ए के द्विवेदी

सदस्य : (1) स्टैंडिंग कमेटी ऑफ एक्सपर्ट्स इन ड्रग्स प्राइसिंग कण्ट्रोल, नई दिल्ली (2) ड्रग्स पैनल फार न्यू ड्रग मेन्युफेक्चरिंग लायसेंस, डायरेक्टर ऑफ मेडिकल एण्ड हेल्थ सर्विसेज यूपी (3) लाइफ मेंबर, इंडियन फार्मास्यूटिकल एसोसिएशन (4) लाइफ मेंबर, सोसाइटी ऑफ बायोलॉजिकल केमिस्ट्स, बैंगलोर (5) लाइफ मेंबर, यूपी एसोसिएशन फॉर एडवांसमेंट ऑफ साइंस एंड टेक्नोलॉजी।

जॉइंट सेक्रेटरी : इंडियन सोसाइटी ऑफ केमिस्ट्स एंड बायोलॉजिस्ट्स, लखनऊ

डॉ नैबेद्य चट्टोपाध्याय

एडिटोरियल एडवाइजरी बोर्ड मेंबर : (1) बायोकैमिकल फार्माकोलॉजी (2) अमेरिकन जर्नल ऑफ फिजियोलॉजी एंडोक्रिनोलोजी एंड मेटाबोलिज्म (3) अमेरिकन जर्नल ऑफ फिजियोल जी सेल फिजियोलॉजी

डॉ अरुण के सिन्हा

सदस्य : (1) साइंटिफिक एडवाइजरी कमेटी (एसएसी) (2) सेंटर ऑफ इनोवेटिव एंड एप्लाइड बायोप्रोसेसिंग (सीआइएबी), मोहाली, पंजाब

डॉ आर पी त्रिपाठी

सदस्य : (1) ज इंट वर्किंग ग्रुप (जेड्ब्लुजी) ऑन फ्रेग्रेन्स एंड फ्लेवर (मिनिस्ट्री MSME गवर्मेंट ऑफ इंडिया) (2) लैब रिसर्च कौंसिल, डीआरडीई (डीआरडीओ) ग्वालियर एडिटोरियल बोर्ड एडिटोरियल बोर्ड सदस्य : (1) ARKIVOC (2) जर्नल ऑफ आर्गेनिक बायोल जिकल केमिस्ट्री

डॉ जवाहर लाल

सदस्य : (1) एडिटोरियल बोर्ड, अमेरिकन जर्नल ऑफ मॉडर्न क्रोमैटोग्राफी, यूएसए (2) एग्जीक्यूटिव मेंबर, इंडियन सोसाइटी ऑफ केमिस्ट्स एंड बायोलोजिस्ट्स, लखनऊ, इंडिया (3) एडिटोरियल एडवाइजरी बोर्ड, केमिस्ट्री एंड बायोलॉजी इंटरफेज

डॉ डी एस उपाध्याय

सदस्य : (1) लाइव स्टॉक फीड, इक्विपमेंट्स एंड सिस्टम, सेक्शनल कमेटी, एफएडी, ब्यूरो ऑफ इंडियन स्टैण्डर्ड, नई दिल्ली (2) वेटरनरी कौंसिल इंडिया (3) यूपी स्टेट वेटरनरी कौंसिल (4) CPCSEA सब कमेटी फॉर रिहैबिलिटेशन ऑफ लेबोरेटरी एनिमल्स (5) मैनेजमेंट कमेटी ऑफ द नेशनल इंस्टिट्यट ऑफ एनिमल वेलफेयर, मिनिस्ट्री ऑफ एनवायरनमेंट एंड फारेस्ट्स, गवर्मेंट ऑफ इंडिया (6) इंस्टिट्यूशनल एनिमल एथिक्स कमेटीस ऑफ सीमैप, आइआइटीआर, इंटीग्रल यूनिवर्सिटी, एएच डिपार्टमेंट, सरस्वती कोलकाता डेंटल कालेज एंड यूनिवर्सिटी, एमिटी यूनिवर्सिटी, लखनऊ

डॉ पी एम एस चौहान

जनरल सेक्रेटरी : आइएससीबी

सदस्य : एड्वाइसरी बोर्ड सेंट्रल यूनिवर्सिटी गुजरात

डॉ अतुल कुमार

सदस्य : (1) ग्लोबल अड्वाइसरी बोर्ड मेंबर ऑफ साइफाइंडर, केमिकल आब्स्ट्रॅक्ट्स सर्विस (सीएएस), अमेरिकन केमिकल सोसाइटी (एसीएस), कोलम्बस, यूएसए, (2) टेक्निकल एवॅल्यूयेशन पैनेल (टीईपी), बिराक, न्यू दिल्ली

डॉ समन हबीब

सदस्य : (1) एनिमल साइंसेस रिव्यू कमिटी, सीएसआइआर, नई दिल्ली (2) सेलेक्शन कमेटी फॉर सीएसआइआर नेहरू पोस्ट-डॉक्टोरल फेलोज (लाइफ साइन्सेस)

डॉ आर रविशंकर

सदस्य : वर्किंग ग्रुप ऑन न्यू टीबी ड्रग्स (डब्लूजीएनडी)

डॉ श्रीकान्त रथ

सदस्य : (1) रिव्यू कमिटी ऑन जेनेटिक मेनिप्युलेशन, डीबीटी इंडिया (2) सब-कमेटी ऑन फर्मुलेटिंग बायोसेफटी गाइड्लाइन्स टु कंडक्ट एंड मॉनिटर कन्फाइंड रिसर्च ट्राइयल्स (सीआरटीएस) ऑन जेनेटिकली इंजिनीयर्ड (जीई) (एसपीटी) राइस, डीबीटी, इंडिया (3) कमेटी फॉर सेफ्टी एंड टॉलरेबिलिटी ऑफ एक्सीपीएंट्स यूज्ड इन पेरेंटल फार्मुलेशन इन सब्सिक्वेंट न्यू ड्रग, डीसीजी(आइ), एफएडी, न्यू दिल्ली (4) कमेटी फार यूज ऑफ पीईटी इन पैकेजिंग ऑफ ड्रग फॉर्म्युलेशन्स फॉर पीडिट्रिक यूज, जेरिएट्रिक यूज एंड फॉर यूज इन केस ऑफ वीमेन एंड वीमेन ऑफ रिप्रोडक्टिव ऐज ग्रुप, द मिनिस्ट्री ऑफ हेल्थ एंड फॅमिली वेलफेयर (5) अकॅडेमिक काउन्सिल, जेएनयू, न्यू दिल्ली

सदस्य एडिटोरियल बोर्ड : सदस्य एडिटोरियल बोर्ड टॉक्सिकॉलाजी इंटरनेशनल

डॉ अमित मिश्रा

सदस्य : 1) इंडियन फार्मास्यूटिकल असोसियेशन (2) आर्गनाइजिंग कमेटी 5वीं ग्लोबल फोरम ऑन टीबी वैक्सीन्स, न्यू दिल्ली, इंडिया (3) यूएनडीपी कन्सल्टेटिव ग्रुप ऑन बायोलौजिकल्स एंड बीयोसिमिलर्स (4) सब्जेक्ट एक्सपर्ट कमेटी (एंटीमाइक्रॉ बियल, एंटीपरासिटिक, एंटीफंगल, एंटीवाइरल) ऑफ सीडीएससीओ एड्वाइसिंग डीसीजीआइ फॉर न्यू ड्रग अप्रूवल्स (5) मेडिकल बायोटेक्नालाजी एंड मेडिकल नैनोटेक्नालाजी सेक्शनल कमेटी, (एमएचडी 20) ऑफ द ब्यूरो ऑफ इंडियन स्टॅंडर्ड्स, गवर्नमेंट ऑफ इंडिया

वाइस-प्रेसीडेंट (इंडिया), एशियन फेडरेशन फॉर फार्मास्यूटिकल साइन्सेस

डॉ पी के शुक्ला

सदस्य : स्टियरिंग कमिटी मेंबर फॉर नायपेर, मिनिस्ट्री ऑफ केमिकल्स एंड फर्टिलाइजर्स, गवर्मेंट ऑफ इंडिया

डॉ संजय बत्रा

सदस्य : (1) रॉयल सोसाइटी ऑफ केमिस्ट्री, यूके (2) नोस्ट, इंडिया (3) गवर्निंग काउन्सिल, केमिकल रिसर्च सोसाइटी ऑफ इंडिया, बेंगालुरू (3) प्रॉजेक्ट अड्वाइसरी कमेटी फॉर केमिकल साइनसेस कमेटी फास्ट ट्रॅक, एसइआरबी-डीएसटी (4) ईसीआरए/एनपीडीए पीएसी कमेटी ऑफ एसइआरबी, न्यू दिल्ली

असोसियेट एडिटर : आरएससी अड्वान्स, आरएससी, यूके

को-चीफ एडिटर : एन्टी-इन्फेक्टिव एजेंट्स

डॉ नीना गोयल

सदस्य : लाइफ मेंबर (1) सोसाइटी ऑफ बाइयोलॉजिकल केमिस्ट्स, इंडिया (2) इंडियन सोसाइटी फॉर पैरासीटॉलाजी, इंडिया

डॉ गौतम पंडा

सदस्य : (1) नेशनल अकेडमी ऑफ साइन्सेस, इलाहाबाद, इंडिया (2) केमिकल रिसर्च सोसाइटी ऑफ इंडिया

डॉ के आर आर्या

जॉइंट सेक्रेटरी : सोसाइटी ऑफ एथनोबोटेनिस्ट, नेशनल बॉटेनिकल रिसर्च इन्स्टिट्यूट, लखनऊ

सदस्य : मेंबर इन द पैनेल ऑफ प्रॉजेक्ट एवॅल्यूयेशन कमेटी, डिपार्टमेंट ऑफ साइन्स - टेक्नालाजी (डीएसटी), न्यू दिल्ली

डॉ भूपेन्द्र एन सिंह

एग्जिक्युटिव सदस्य : (इलेक्टेड) ऑल इंडिया सोसाइटी सेल बायालाजी

डॉ कुमकुम श्रीवास्तव

एग्जिक्युटिव कमिटी सदस्य : इंडियन सोसाइटी फॉर पैरासीटोलाजी, इंडिया

डॉ पी के मिश्रा

सदस्य : सदस्य एडिटोरियल बोर्ड, (1) रीसेंट पॅटेंट्स इन ड्रग डेलिवरी एंड फार्मूयुलेशन्स (बेंथम साइन्सेस) (2) जर्नल ऑफ फार्मसूटिकल एंड बायोमेडिकल साइन्सेस फाउंडर मेंबर, इंडियन नेनोसाइन्स सोसाइटी

डॉ अतुल गोयल

चेयरपर्सन : (टेक्निकल सेशन), XII जूनियर-नोस्ट कान्फरेन्स (जे नोस्ट-2016)

डॉ मनीष के चौरसिया

सदस्य : BIRAC एक्सपर्ट कमेटी फॉर सीआरएस एंड बिग ग्रांट्स

डॉ राजेंदर सिंह

सदस्य : सेनेट ऑफ अकॅडमी ऑफ साइंटिफिक एंड इनोवेटिव रिसर्च

डॉ अरुण के त्रिवेदी

सदस्य : लाइफमेंबर (1) बायोटेक रिसर्च सोसाइटी ऑफ इंडिया (बीआरएसआइ) (2) इंडियन असोसियेशन फॉर कैन्सर रिसर्च (IACR)

डॉ मोनिका सचदेव

सदस्य : (1) इंडियन सोसाइटी ऑफ सेल बायालाजी, इंडिया (2) सोसाइटी फॉर फ्रंटियर्स इन रिप्रोडक्शन, यूएसए (3) सोसाइटी फॉर स्टडी ऑफ रिप्रोडक्शन, यूएसए (4) इंडियन सोसाइटी फॉर द स्टडी ऑफ रिप्रोडक्शन एंड फर्टिलिटी (5) इंटरनॅशनल सोसाइटी ऑफ ट्रॅन्सजेनिक टेक्नालॉजी

डॉ मृगांक श्रीवास्तव

सदस्य : (1) मेंबर ऑफ अमेरिकन सोसाइटी फॉर माइक्रोबायालॉजी, (2) सोसाइटी फॉर लूकोसाईट बायालॉजी

डॉ विवेक भोसले

सदस्य : (1) इन्स्टिट्यूशनल एथिक्स कमेटी, सीएसआइआर-सीमैप (2) इन्स्टिट्यूशनल एथिक्स कमेटी स्टेट आयुर्वेद कॉलेज, लखनऊ

डॉ रविशंकर भट्टा

एडिटोरियल बोर्ड सदस्य : जर्नल ऑफ ड्रग फार्मुलेशन एंड प्रोडक्शन

सदस्य : इंटरनेशनल सोसाइटी फॉर स्टडी ऑफ जीनोबायोटिक्स (ISSX), यूएसए

डॉ जियाउर आर गाईन

एडिटोरियल बोर्ड सदस्य : जर्नल ऑफ एनडोक्रिन लाजी एंड डाइयबिटीस रिसर्च, यू के

सदस्य : लाइफ-सदस्य (1) असोसियेशन ऑफ बायोटेक्नालाजी एंड फार्मेसी, इंडिया (2) इंडियन सोसाइटी फॉर मास स्पेक्ट्रॉमेट्री (3) इंडियन फार्मकोलॉजिकल सोसाइटी (4) सोसाइटी ऑफ बाइयोलॉजिकल केमिस्ट्स, इंडिया (5) द इंडियन साइन्स कांग्रेस असोसियेशन (6) लॅबोरेटरी एनिमल साइन्स असोसियेशन ऑफ इंडिया (7) सोसाइटी ऑफ अप्लाइड बाइयोटेक्नालाजी, इंडिया

डॉ वहाजुद्दीन

सदस्य एडिटोरियल बोर्ड: (1) जर्नल ऑफ बायोएकुइवलेंस एंड बायोअवेलबिलिटीय (2) अनलिटिका फार्मासुटिका एक्टा (3) फार्मसूटिकल रेग्युलेटरी अफेयर्स

लाइफ सदस्य : नेशनल ऑकेडमी ऑफ साइन्सेस (इंडिया)

डॉ राजेश कुमार झा

सदस्य : (1) इंडियन सोसाइटी फॉर द स्टडी ऑफ रिप्रोडक्शन एंड फर्टिलिटी (आइएसएसआरएफ) (2) सोसाइटी फॉर द स्टडी ऑफ रिप्रोडक्शन (एसएसआर)

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T. Narender, M.Sc., Ph.D.
Senior Scientist
K.V. Sashidhara, M.Sc., Ph.D.
Maddi Shridhar Reddy, M.Sc., Ph.D.
Kishor Mohanan , M.Sc.,Ph.D.
Pintu Kumar Mandal, M.Sc.,Ph.D.
Prem Prakash Yadav, M.Sc., Ph.D.
Scientist
Ranveer Singh, M.Tech.
Dipankar Koley, M.Sc., Ph.D.
Namrata Rastogi, M.Sc. Ph.D.
Principal Technical Officer
R.K. Asthana, M.Sc., Ph.D.
Senior Technical Officer (3)
Tara Rawat, B.Sc.
Deepali Pandey, B.Sc.
Senior Technical Officer (1)
Atma Prakash Dwivedi, M.Sc.
Technical Officer
Ashok Kumar Sharma, B.Sc., D.Ch.E., A.M.I.E.
K.S. Anil Kumar, M.Sc., Ph.D., P.G.D.C.A.,
Tahseen Akhtar, M.Sc.
Surya Pratap Singh, M.Sc., Ph.D
Senior Technician (2)
Preeti Rastogi, M.Sc.
Ramjeet, B.Sc., PGDC
Radha Rani Gupta, B.Sc.
Raju Arora, B.Sc.
Anoop Kumar Srivastava, M.Sc
Shashi Rastogi, M.Sc.
Mithilesh Sharma, M.Sc.
Veena Mehrotra, M.Sc.
Rajesh Kumar Verma

A.K. Pandey, B.Sc.
S.C. Tiwari, B.Sc.
Manju, B.Sc.
Senior Technician (1)
Ram Lakhan
Technician (2)
H.R. Misra, M.Sc.
N.P. Misra, M.Sc.
Krishna Kumar, B.Sc.
Technician (1)
Rajesh Kumar
Private Secretary
Avadhesh Kumar, B.A.
Lab. Assistant
J.C. Rajan
M.S. Bhol (Retired on 31.03.2016)
Satish Chandra Yadav, B.Sc.

MICROBIOLOGY

Senior Principal Scientist
P.K. Shukla, M.Sc., Ph.D. *In-Charge*
K.K. Srivastava, M.Sc., Ph.D.
Principal Scientist
B.N. Singh, M.Sc., Ph.D.
Senior Scientist
Arunava Dasgupta, M.Sc., Ph.D.
Sudhir Kumar Singh, M.Sc., M.Tech., Ph.D.
Y. K. Manju, M.Sc.,Ph.D
Sidharth Chopra, M.Sc., Ph.D.
Mukesh Pasupuleti, M.Sc, Ph.D
Trainee Scientist
Neha Topno, M.Sc.
Principal Technical Officer
Bikram Banarjee (Retired on 30.06.2016)
Senior Technical Officer (3)
Agney Lal, B.Sc.
Senior Technical Officer (1)
Sandeep Kumar Sharma, M.Sc. Ph.D
Technical Assistant
Atul Krishna, B.Sc., DMLT
Umamageswaran V., M.Sc.
Senior Technician (2)
D.K. Tripathi, M.Sc.
Lab. Assistant
A.N. Dixit, B.A.
Lab. Attendant (2)
Ravi Shankar Misra
Ram Prakash, B.A.
Shyam Sunder Yadav, B.A.

MOLECULAR & STRUCTURAL BIOLOGY

Senior Principal Scientist
Saman Habib, M.Sc., Ph.D., FASc
Ravishankar Ramachandran, M.Sc., Ph.D. *In-Charge*
Principal Scientist
Jimut Kanti Ghosh, M.Sc., Ph.D., FNASc
J. Venkatesh Pratap, M.Sc., Ph.D.
Mohammad Imran Siddiqi, M.Sc., Ph.D.
Senior Scientist
Ashish Arora, M.Sc., Ph.D.
Mohammad Sohail Akhtar, M.Sc., Ph.D.
Amogh Anant Sahasrabuddhe, M.Sc., Ph.D.
Shakil Ahmed, M.Sc., Ph.D.
Scientist
Dibyendu Banerjee, M.Sc., Ph.D.
Tejender S. Thakur, M.Sc., Ph.D.
Senior Technical Officer (3)
J.P. Srivastava, B.Sc., LL.B.
R.K. Srivastava, B.Sc.
Senior Technical Officer (1)
Ruchir Kant, M.Sc. Ph. D
Technical Officer
Anupam Jain, M.Sc.
Rima Ray Sarkar, M.Sc
Sarita Tripathi, M.Sc.
Senior Technician (2)
Ram Radhey Shyam

PARASITOLOGY

Chief Scientist
Shailja Bhattacharya, M.Sc., Ph.D., FNASc. (Retired on 31.03.2016)
Senior Principal Scientist
Renu Tripathi, M.Sc., Ph.D,. FNASc. *In-Charge*
Principal Scientist
Kumkum Srivastava, M.Sc., Ph.D.
Senior Scientist
Satish Mishra, M.Sc, Ph.D
Scientist
Mrigank Srivastava, M.Sc., Ph.D.
Susanta Kar, M.Sc., Ph.D.
Niti Kumar, M.Sc., Ph.D.
Technical Assistant
Shikha Mishra, M.Sc.
Ashan Manhas, B.Sc., M.L.T
Senior Technician (2)
K.K. Singh, M.Sc.
Lab. Attendant (2)
Prem Babu
Lab. Attendant (1)
Ram Das
Om Prakash

PHARMACEUTICS

Chief Scientist
A.K. Dwivedi, M.Sc., Ph.D.
Senior Principal Scientist
Amit Misra, M.Pharm., Ph.D., *In-Charge*
Principal Scientist
Prabhat Ranjan Mishra, M.Pharm., Ph.D.
Senior Scientist
Manish Kumar Chourasia, M.Pharm., Ph.D.
Technical Assistant
V. Saravanakumar, M.Sc., M.Phil.,PGDCA, DIS
Deepak, M.Sc.,
Senior Technician (2)
S.K. Bhatnagar, B.Sc.
Lab. Attendant (2)
Ram Kumar

PHARMACOKINETICS & METABOLISM

Senior Principal Scientist
Jawahar Lal, M.Pharm., Ph.D. *In-Charge*
Senior Scientist
Rabi Sankar Bhatta, M.Pharm., Ph.D.
Scientist
Wahajuddin, M.S(Pharma)., Ph.D
Jiaur Rahaman Gayen, M.Pharm., Ph.D.
Principal Technical Officer
S.K. Pandey, M.Sc.
Senior Technician (2)
Narendra Kumar, B.Sc
Private Secretary
Nandita Pandey, B.A.
Technician (2)
Akhilesh Kumar
Lab. Assistant
Shiv Lal
Lab. Attendants (2)
Ram Bhajan Shukla
Lab. Attendants (1)
Ram Sunder Lal, B.A.
Chandramani

PHARMACOLOGY

Chief Scientist
Rakesh Shukla, M.Sc., Ph.D., FIPS., FIAN. (Retired on 31.08.2016)
Senior Scientist
Manoj K. Barthwal, M.Sc., Ph.D. *In-Charge*
Anil Gaikwad, MS (Pharma), Ph.D.
Prem N Yadav, M.Sc., Ph.D.
Kumaravelu Jagavelu, M.Sc., Ph.D.
Scientist
Kashif Hanif, M.Sc., Ph.D.
Shubha Shukla, M.Sc., Ph.D.
Senior Technical Officer (3)
V.S. Nigam, B.Sc.
C.P. Pandey, M.Sc.
Technical Officer
Sheeba Saji Samuel, M.Sc.
Sachi Bharti, M.Sc.
Technical Assistant
Smriti, M.Sc.
Pankaj Kumar Shukla, B.Sc., P.G.D.B.T.
Divya Mohan, M.Sc.
Deep Mala, M.Sc
Senior Stenographer
Varun Kumar Pathak, B.A
Senior Technician (2)
H.C. Verma, B.A.
Bharti Bhushan, B.Sc.
Ramesh Chandra, M.Sc.
Senior Technician (2)
Anil Kumar Verma, B.Sc.
Technician (2)
Surendra Singh, M.Sc., Ph.D
Lab. Attendent (1)
Pankaj Sengupta
Hari Joshi

TOXICOLOGY

Senior Principal Scientist
R.K. Singh, M.Sc., Ph.D., D.Sc. *In-Charge*
Sharad Sharma, M.B.B.S., M.D.
S.K. Rath, M.Sc., Ph.D.
Principal Scientist
R.K. Tripathi, M.Sc., Ph.D.
Senior Scientist
Aamir Nazir, M.Sc., Ph.D.

Smrati Bhadauria, M.Sc., Ph.D.
Sarika Singh, M.Sc., Ph.D.
Scientist
Poonam Singh, M.Sc., Ph.D. (Transferred to CSIR-CECRI, Karaikudi)
Principal Technical Officer (3)
P.K. Agnihotri, M.Sc., Ph.D.
Senior Technical Officer (3)
Sadan Kumar, M.Sc
Technical Officer
Anurag Kumar Srivastava, B.Sc.
Technical Assistant
Anil Kumar Meena, M.Sc., B.Ed.
Navodayam Kalleti, M.Sc.
Sudhakar Yadav, M.Sc., M.L.T.
Senior Technician (2)
Anupma, B.Sc.
Lab. Assistant
Shree Krishan
Lab. Attendant (2)
Ram Kumar
Nand Pal Yadav
Ganesh Prasad – Expired on 10.08.2016

TECHNICAL INFRASTRUCTURE DIVISION/UNITS

ACADEMIC AFFAIRS UNIT

Principal Scientist
Anju Puri, M.Sc., Ph.D.
Senior Technician (2)
A.K. Pandey, B.Sc.

BUSINESS DEVELOPMENT& INTELLECTUAL PROPERTY UNIT

Scientist
Naseem Ahmed Siddiqui., B. Pharma, M.B.A.
Sripathi Rao Kulkarni, M.Sc., Ph.D., P.G. Dip. In Patent Law
Senior Technical Officer (3)
A.S. Kushwaha, B.Sc.
Technical Assistant
Neelima Srivastava, M.C.A
Technician (1)
Preeti Agarwal, M.C.A.

COMPUTER CENTRE

Chief Scientist
A.K. Srivastava, B.E., *Centre In-Charge*
Senior Principal Scientist
Kural, B.E.
Scientist
Santhosh Shukla, B.Tech.
Technical Officer
Ajay Kumar Maurya, M.C.A.
Technician (2)
R.A. Prajapati, M.A.
Technician (1)
Sumit Khichi
Lab Assistant
Laxmi Prasad (Retired on 30.11.2016)

LABORATORY ANIMALS FACILITY

Chief Scientist
D.S. Upadhyay, M.V.Sc., Ph.D., *In-Charge*
Principal Scientist
S. Raja Kumar, M.Sc
Senior Scientist
Dhananjoy Hansda, M.V.Sc.
Trainee Scientist
H.K. Bora, M.V.Sc
Principal Technical Officer (3)
S.N.A. Rizvi, M.Sc. (Retired on 31.10.2016)
Senior Technical Officer (3)
Karunesh Rai, M.Sc.
Technical Assistant
Chandra Shekhar Yadav, M.Sc.
Senior Technician (2)
A.K. Dubey, B.A.
Ravinder Singh, M.Sc., Ph.D.
S.R. Yadav, B.A. (Retired on 31.01.2017)
Sanjeev Kumar Saxena, B.Sc.
Ravi Kumar Shukla
Senior Technician (1)
Narendra Kumar, B.A.
Dinesh Kumar, B.A.
Pradeep Tirkey
Technician (2)
Arun Sharma, B.Sc.
Senior Steno (H)
Raj Kumar, B.A.
Lab. Assistant
V.B.L. Srivastava
S.K. Verma
Shiv Pal Singh
P.B. Thapa
O.P. Verma, B.A.
Mohd. Saleem
G.K. Sharma
Dilip Kumar
Lab. Attendants (2)
Jameel Beg
Lab. Attendants (1)
Changa Lal
Najbullah

KNOWLEDGE RESOURCE CENTRE

Chief Scientist
S.K. Mallik, M.A., M.L.I.Sc., *In-Charge*
Principal Technical Officer
Sanjay Kumar, M.L.I.Sc
G.C. Gupta, B.Sc.
Senior Technical Officer (1)
Ramesh Chandra Gupta, M.L.I.Sc.
Senior Steno
Himanshu Upadhyay, B.A
Technical Officer
Pankaj Upreti, M.L.I.Sc

OTHER LAB SERVICES

Senior Principal Scientist
N.K. Agarwal, M.Sc.,
Senior Scientist
Manoj Kumar Rawat, M. Tech.
Senior Technical Officer (3)
R.N. Lal, M.Sc.
Senior Technical Officer (1)
Ram Karan Harijan, AMIE
Sanjay Kumar, Diploma
Technical Officer
Arbind Kumar, B.C.A, PGDCA
Senior Technician (2)
V.K. Mishra, Diploma
J.K. Joshi, B.Sc.
Kamal Kishore Verma, ITI
Kamal Singh, ITI
Laxmi Narain, ITI
Shailendra Mohan, M.Sc., PGDCA
K.M. Shukla, B.Sc.
Suresh S. Bhakuni
Technician (1)
Kul Bahadur Thapa, ITI (Electronics)
Lab. Assistant
Makhan Lal
Gopi
Lakhana Devi
Mohd. Islam

S & T MANAGEMENT UNIT

Chief Scientist
Vinay Tripathi, M.Sc., M.B.A., P.G. Dip., *Unit In-Charge*
Senior Principal Scientist
D.N. Upadhyay, M.Sc., Ph.D.
Principal Scientist
Prem Prakash, M.Pharm.
Senior Scientist
Anand P. Kulkarni, M.Sc., Ph.D. (*Director Secretariat)*
Junior Scientist
Sanjeev Yadav, M.Sc., Ph.D.
Senior Technical Officer (3)
Ravindranath S. Londhe, GD Art (Comm.), Art Teachers Dip.
Hindi Officer
Neelam Srivastava, M.A., B.Ed., L.L.B.
Technical Officer
Savita Tripathi, M.Sc., B.Ed.
Technical Assistant
Farha khan, M.C.A *(Director's Secretariat)*
M. Muruganantham, B.Sc., M.B.A
Private Secretary
Manoshi Chatterjee, B.A., B.L.I.Sc. (Retired on 31.10.2016)
Senior Technician (2)
Chandrika Singh, B.Sc., LL.B.
Technician (2)
Susheel Kumar, B.Sc
Lab. Assistant
Kishori Kumari
Lab. Attendant (1)
Pradeep Kumar Srivastava, B.Sc.

SOPHISTICATED ANALYTICAL INSTRUMENT FACILITY

Senior Principal Scientist
Brijesh Kumar, M.Sc., Ph.D. *Mass Unit In-charge, and Overall Facility In-charge*
Senior Scientist
Ravi Sankar Ampapathi, M.Sc., Ph.D. *NMR*

Unit In-charge
Jagadeshwar Reddy Thota, M.Sc., Ph.D (Transferred to IICT, Hyderabad)
Sanjeev Kumar Shukla, M.Sc., Ph.D.
Sanjeev Kanojiya, M.Sc., Ph.D.
Kalyan Mitra, M.Sc., Ph.D. *Electron Microscopy Unit In-charge,*
Principal Technical Officer
AL Vishwakarma (Retired on 30.06.2016)
H.M. Gauniyal, M.Sc. Ph.D
Rakesh Khanna, B.Sc., A.I.C
A.K. Mandwal, M.Sc., Ph.D.
A.K. Sinha, M.Sc.
Senior Technical Officer (3)
Sunil Kumar, B.Sc.
Pramod Kumar, M.Sc.
Senior Technical Officer (2)
R.K. Purshottam, B.Sc.
Technical Officer
Kavita Singh, M.Sc. Ph.D.
Binod Kumar Saw, M.Sc.
Garima Pant, M.Sc.
Technical Assistant
Pooja Soni, Diploma
Tofan Kumar Rout, M.Sc. Ph.D.
S. Mehazabeen, B.Sc.
Amit Kumar, M.Sc., M.Tech
Senior Technician (2)
Ashok Pandey, B.Sc.
Sandeep Sengupta, B.Sc.
Radhey Krishna, B.Sc., L.T., C.Lib.Sc.
V.K. Maurya, ITI
Akhilesh Kumar Srivastava, B.Sc.
Madhuli Srivastava, B.A.
O.P. Gupta, B.Sc.
S.A. Singh, B.Sc., PGDCA
D.N. Vishwakarma
Madhu Chaturvedi, Diploma
Senior Steno
Surendra Kumar, B.Com
Asst. (G) Grade I
V.K. Kanal (Retired on 31.08.2016)
Lab. Attendants (2)
J.S. Singh (Retired on 31.01.2017)

ENGINEERING SERVICES DIVISION

Senior Superintending Engineer
Parvez Mahmood, B.Sc.,Engineering(Civil), *In-Charge*
Superintending Engineer
Kamal Jain, B.E., (Electrical)
Assistant Executive Engineer
Mohit Kumar Shukla, A.M.I.C.E (Civil)
Jai Prakash, Diploma
Sidho Hembrom, Diploma
Assistant Engineer
D.K. Vishwakarma, Diploma
Brahma Singh (Transferred from CSIR-NML to CSIR-CDRI from 25.01.2017)
Junior Engineer
Madhukar Saroj, Diploma
Ajay Kumar, Diploma
Asstt. (G) Grade I
B.K. Shukla, B.Com
Senior Technician (2)
Mohd. Naseem (Retired on 30.06.2016)
B.P. Sunwar, Diploma
Radhey Lal
A.K. Sonkar, ITI
K.K. Kaul, ITI
Mahindra Singh, ITI
Basudev Pradhan
M.S. Verma, BA, ITI
Harish Kumar
Vijay Kumar
Swapan Karmi
Ramesh Kunwar
Arun Kumar Srivastava, ITI
Senior Technician (1)
G.C. Roy, ITI
Lab. Assistants
Ramanuj
Rama – (Retired on 31.01.2017)
Popinder Singh
S.K. Bhattacharya
T.P. Pathak - Expired
S.K. Yadav
Bishan Singh
A.K. Misra
Om Prakash
Shankar Roy
Z.U. Beg
Ramesh Chandra
Lab Attendant (2)
Sandeep Roy
Dhirendra Misra
Mohd. Irfan
Raju Vishwakarma
Ram Autar
Hari Om Garg
Satyajeet Roy
Ram Samujh
Bindeswari Prasad
Lab. Attendant (1)
Darshan Lal
Vishwanath Nigam
Suresh Kumar
Ram Bilas
Gaya Prasad
Ram Asrey***Group D***
Om Prakesh
Hanuman
Radhey Shyam
Hari Prasad
Maiku Lal-II

GENERAL ADMINISTRATION AND FACILITIES

ADMINISTRATION

COA OFFICE

Controller of Administration
CP Arunan, BA
Asstt. (G) Grade I
Kamla Kandpal, M.A
Lab. Assistants
Sohan Lal
Multi Tasking Staff
Sourav Sarkar

DIRECTOR'S OFFICE

Private Secretary
Sumit Srivastava, B.Com.
Sunita Chopra, B.A.
Senior Technician (1) (Driver)
Shakeel Ahmad Khan
Lab. Attendant (2)
Nand Kishore
Trainee
Rajesh

ESTABLISHMENT I

Section Officer (G)
Krishna Raj Singh, B.Sc, MSW
Asstt. (G) Grade I
Vibhash Kumar, B.A (Hons), CIC
Jagdish Prasad, B.Sc., MPA
Saju P. Nair
Reena Bisaria, B.A
Riti Choudhary, B.A
Senior Steno
Deepak Dhawan, BA
Lab. Assistant
Vinod Kumar
Group-C
Manju Yadav
ESTABLISHMENT II
Section Officer (G)
Nitu Kumari, B.Sc., M.A
Asstt. (G) Grade I
Rashmi Srivastava, B.A, B.Ed
Dilip Kumar Sen, B.Com
Gangadin Yadav, B.A
Javed Sayed Khan, B.A.
Vivek Bajpai, M.A
Neena Raizada, B.A
Aparna Bajpai, B.A
Senior Steno
Vinod Kumar Yadav, B.A
Lab. Assistant
Bhagwanti Devi
Multi Tasking Staff
Ram Kumar, B.Com

GENERAL SECTION

Section Officer (G)
CS Rao (Retired on 31.01.2016)
Ishwar Nath Jha
Asstt. (G) Grade I
Kailash Chandra
Rajendra Prasad, B.A
Ajay Shukla, M.Com
Senior Steno (ACP)
Seema Srivastava, M.A
Asstt. (G) Grade II
Rani
Mohd. Irfan
Senior Technician (2) (Driver)
K.K. Kashyap
Drivers
Prem Chand
Daya Shankar Singh
Multi Tasking Staff
Kalpanath Sharma
Mohd. Saleem

RECORDS

Asstt. (G) Grade I
Birendra Singh, B.A
Lab. Assistant
Ved Prakash Misra

BILL SECTION

Section Officer (G)
Nitu Kumari, B.Sc., M.A
Asstt. (G) Grade I
H.K. Johar, B.A
Valsala G. Nair
Dilip Kumar (Cash), B.A, LLB
Senior Steno
Renuka Mushran
Senior Technician (2)
Ram Pal Rawat, B.Sc., LLB
Asstt. (G) Grade I
Nida Parveen, B.Com
Lab. Attendant (2)
Lalji Prasad
Vinod Kumar Sharma, BA
Trainee
Faizi

VIGILANCE

Section Officer
Anil Kumar, B.Sc.
Asstt. (G) Grade I
Prashant, BE (Resigned)
Senior Steno
Vineet Pandey, B.A., P.G. Comp.
Lab Assistant
Shanti Devi (Retired on 30.06.2016)
Ramesh Chandra

HINDI SECTION

Senior Hindi Officer (SG)
V.N. Tiwari, M.A., Ph.D.
Senior Steno (Hindi)
Anil Kumar, B.Com
SECURITY
Security Officer
Anil Kumar Upadhyay, M.A.

FINANCE & ACCOUNTS

Controller of Finance & Accounts
A.K. Dwivedi, B.Sc, M.A
Finance & Accounts Officer
IB Dixit, M.Sc, M.B.A
Bhaskar Kumar Ravi, MBA
Section Officer (F&A)
Kailash Singh (Retired on 31.01.2017)
R.P. Tripathi, M.Com, LL.B
Private Secretary
V.P. Singh, B.A
Asstt. (F&A) Grade I
Mahesh Babu, B.A
S.L. Gupta, B.A
Sasidharan Radha
U.K. Tewari, B.Sc
Rekha Tripathi, B.H.Sc.
Ajay Kumar, B.A
Asstt. (F&A) Grade II
D.K. Khare, M.Com
Mahender Kumar, B.Com
Sanjay Kumar, B.A
Tahseen Tilat, B.A
S.A. Siddiqui, B.A
Chandrashekhar
Asstt. (F&A) Grade III
Abhishek Kumar
Lab. Attendants (2)
Vikramaditya
Angad Prasad
Multi Tasking Staff
Mohd. Firoz, B.A

STORES & PURCHASE

Stores & Purchase Officer
MP Singh
Krishna Kumar
Asstt. (S&P) Grade I
AK Govil (Retired on 29.02.2016)
AK Mishra (Retired on 31.08.2016)
P.S. Chauhan, B.Sc
Arun Wadhera
A.K. Misra, B.A
H.B. Neolia, M.A
R.C. Dwivedi, B.Com
Md. Rijwan, B.Tech, MPA
Asstt. (S&P) Grade II
M.C. Verma, B.Com
Srikant Mishra, B.A
Asstt. (S&P) Grade III
Kanchan Bala, B.A
Vandana Parwani, B.A
G.P. Tripathi
Chakrasen Singh
Senior Steno (H)
Jitendra Patel, M.A.
Senior Technician(2)
Ravi Kumar Mehra, B.A.
Nuzhat Kamal, B.Sc.
Lab. Assistant
Rama Shukla
Kamlesh
Lab Attendant
Hardwari

CSIR DISPENSARY

Medical Officer Group III (7)
Asha Negi, M.B.B.S., M.D. In charge
Medical Officer Group III (5)
N.K. Srivastava, M.B.B.S.
Medical Officer Group III (4)
Shalini Gupta, M.B.B.S.
Kunal Gupta, M.B.B.S.
Senior Technician (2)
Nandita Dhar, Diploma in Nursing
Technician (1)
Shraddha, M.A., Diploma in Nursing
Shabana, B.A., Diploma in Pharmacy
Lab. Assistant
S.K. Paswan
Lab Attendant (1)
Shubhendra Kumar

CANTEEN

Manager Gr. II (ACP)
J.P. Satti, B.A
Asstt. Manager & Store Keeper (ACP)
R.S. Tewari
Count Clerk (ACP)
Ram Jiyawan Tewari
Y.K. Singh, B.A
Cook (ACP)
Man Bahadur
Asstt. Halwai
Uma Shanker Tewari
Bearer
Ganga Ram
Rajender
Sukhdev Prasad
S/Man
Raj Kumar
Wash Boys
Ram Murat
Dinesh Pal Singh

CSIR-Central Drug Research Institute, Lucknow