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CSIR - CDRI Newsletter

Council of Scientific & Industrial Research
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CSIR-Central Drug Research Institute
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From the Director's Desk

Indeed, it is my pleasure to share with you the current issue of CSIR-CDRI Newsletter. The following pages, gives glimpse activities and achievements of CSIR-CDRI during last six months. I am glad that the Institute is making strident progress in all fronts towards fulfilling our mandate. Though, I have been associated with this Institute for more than 36 years, but close intimacy with colleagues and students from all the corners after taking over the charge as Director, made me amply aware of the innate strengths and dynamism of the Institute to face any challenge. I whole heartedly appreciate my colleagues and students who are relentlessly serving the Institute to fulfil its mandate.

The last size months were very eventful for scientific community and provided a milieu to the experts from research institutions, academia, industry and international agencies. Institute organized several National & International Conferences including the *25th National Conference of Parasitology* (16-18 October, 2014); the *43rd National Seminar on Crystallography* (12-14 November, 2014); *National Symposium on Clinical Research* (3-4 December, 2014); the *37th All India Cell Biology Conference* (10-12 December, 2014); One Day Symposium on "*Drug Discovery in India: Past, Present and Future*" on 90th Birth Anniversary of Padmashri Dr. Nitya Anand (1 January 2015), *21st ISCB International Conference* (25-28 February 2015) and *National Symposium on "Animals in Research and Testing: A Cross-Talk between Relevance and Ethics*-NSART 2015(13-14 March 2015). These conferences were very useful for exchange of recent research updates and got overwhelming response from all corners of India as well abroad. More than 500 delegates participated in these scientific congregations and presented more than 350 research papers and delivered about 100 invited & plenary lectures. The delegates not only appreciated the scientific interactions & New state-of-art CSIR-CDRI campus, but also the cultural heritage of Lucknow; the historical city famous for its etiquette. I extend my heartiest congratulations to all my colleagues for organizing these conferences and for providing such platform to young researchers to interact and enhance their knowledge for better understanding of Drug Discovery and Development.

Before concluding this message, I feel privileged to report that Institute retained its trend of improved performance year after year in all the aspects of performance parameters including Publication, Patents, New Projects, New MoU/Agreements and Honours & Awards. Details of these accomplishments are given in the ensuing pages.

I record my heartiest thanks and deepest gratitude to the entire staff of the Institute for their dedicated and wholehearted support in progressive functioning of the Institute and look forward for continued support.

M. Dikshit

With best wishes

(Madhu Dikshit)

A Newsletter from
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CONTRIBUTIONS TO SCIENCE & TECHNOLOGY

1. **Palladium-Catalyzed Regio-and Stereoselective Cross-Addition of Terminal Alkynes to Ynol Ethers and Synthesis of 1,4-Enyn-3-ones,** (Madala Hari Babu, Vikas Dwivedi, Ruchir Kant and Maddi Sridhar Reddy, ***Angewandte Chemie International Edition***, 54(12), 3854–3857, **IF:11.336**)

   Conjugated enynes, enol ethers, and enynones are versatile building blocks that can be elaborated by a wide variety of synthetic transformations. The selective synthesis of such units is a prerequisite for their effective utilization. The synthesis of conjugated 2-phenoxyenynes through a palladium-catalyzed cross-addition of terminal alkynes to phenylethynyl ethers (hydroalkynylation) is now presented. The reaction is highly regio-, stereo-, and chemoselective, and shows excellent tolerance toward functional groups. The addition further features very mild reaction conditions (room temperature) and an inexpensive catalytic system (without a ligand and with a cheaply available Pd catalyst). The thus synthesized enynyl ethers with allylic hydroxy tethers, which survived the reaction, were shown to be ready precursors for valuable 1-en-4-yn-3-ones.

2. **Thiol–Ene "Click" Reaction Triggered by Neutral Ionic Liquid: The "Ambiphilic" Character of [hmim]Br in the Regioselective Nucleophilic Hydrothiolation,** (Rajesh Kumar, Saima, Amit Shard, Nitin H. Andhare, Richa and Arun K. Sinha, ***Angewandte Chemie International Edition***, 54(3), 828–832, **IF:11.336**)

   Thiol–ene "click" chemistry has emerged as a powerful strategy to construct carbon–heteroatom (C-S) bonds, which generally results in the formation of two regioisomers. To this end, the neutral ionic liquid [hmim]Br has been explored as a solvent cum catalyst for the synthesis of linear thioethers from activated and inactivated styrene derivatives or secondary benzyl alcohols and thiols without the requirement of using a metal complex, base, or free radical initiator. Furthermore, detailed mechanistic investigations using 1H NMR spectroscopy and quadrupole time-of-flight electrospray ionization mass spectrometry (Q-TOF ESI-MS) revealed that the "ambiphilic" character of the ionic liquid promotes the nucleophilic addition of thiol to styrene through an anti-Markovnikov pathway. The catalyst recyclability and the extension of the methodology for thiol–yne click chemistry are additional benefits. A competitive study among thiophenol, styrene, and phenyl acetylene revealed that the rate of reaction is in the order of thiol–yne>thiol–ene>dimerization of thiol in [hmim]Br.

3. **Pathophysiological mechanism of bone loss in type 2 diabetes involves inverse regulation of osteoblast function by PPARγ coactivator-1α and skeletal muscle atrogenes: adiponectin receptor 1 as a potential target for reversing diabetes-induced osteopenia (**Khan MP, Singh AK, Joharapurkar AA, Yadav M, Shree S, Kumar H, Gurjar A, Mishra JS, Chandra Tiwari M, Nagar GK, Kumar S, Ramachandran R, Sharan A, Jain MR, Trivedi AK, Maurya R, Godbole MM, Gayen JR, Sanyal S, Chattopadhyay N, ***Diabetes***, 64(7), 2609-23 **IF: 8.474)**

   Type 2 diabetes is associated with increased fracture risk and delayed facture healing; the underlying mechanism however remains poorly understood. Here we made a systematic investigation of skeletal pathology in leptin receptor-deficient diabetic mouse in C57/BLKS background (db). Compared with wild-type (wt), db mice displayed reduced peak bone mass and age-related trabecular and cortical bone loss. Poor skeletal outcome in db was contributed by high glucose and non-esterified fatty acid (NEFA)-induced osteoblast apoptosis that was associated with PPARγ coactivator 1-α (PGC-1α) downregulation and upregulation of skeletal muscle atrogenes in osteoblasts. Osteoblast depletion of the atrogene, muscle ring finger protein-1 (MuRF1) protected against gluco- and lipotoxicity-induced apoptosis. Osteoblast-specific PGC-1α upregulation by 6-C-β-d-glucopyranosyl-(2S,3S)-(+)-5,7,3',4'-tetrahydroxydihydroflavonol (GTDF), an adiponectin receptor 1 (AdipoR1) agonist as well as metformin in db mice that lacked AdipoR1 expression in muscle but not bone, restored osteopenia to wt levels without improving diabetes. Both GTDF and metformin protected against gluco- and lipotoxicity-induced osteoblast apoptosis and depletion of PGC-1α abolished this protection. While AdipoR1 but not AdipoR2 -depletion abolished protection by GTDF, metformin action was not blocked by AdipoR-depletion. We conclude that PGC-1α upregulation in osteoblasts could reverse type 2 diabetes-associated deterioration in skeletal health.

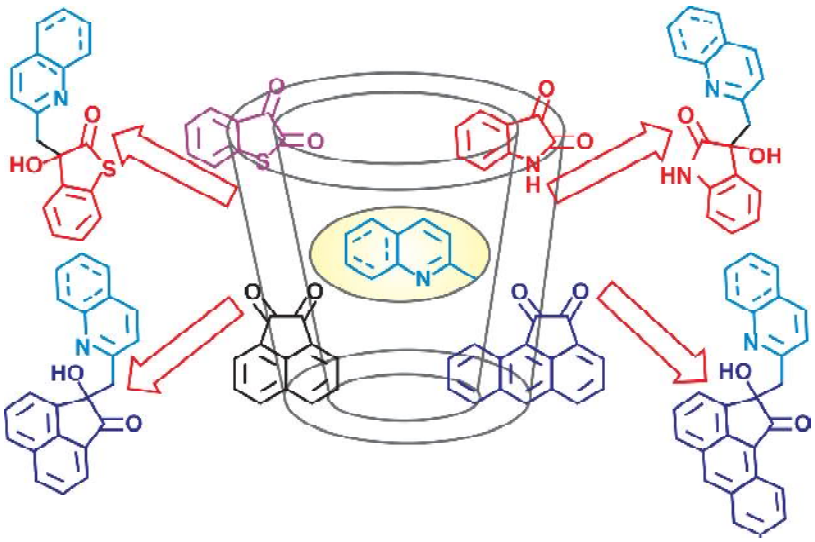
4. **Variants of self-assembling peptide, KLD-12 that show both rapid fracture healing and antimicrobial properties (**Jitendra K. Tripathi, Subhashis Pal, Bhanupriya Awasthi, Amit Kumar, Anshika Tandon, Kalyan Mitra, Naibedya Chattopadhyay, Jimut Kanti Ghosh, ***Biomaterials***, 56, 92–103, **IF:8.312)**

KLD-12 (KLD) is a 12-residue self-assembling peptide that can adopt nano-structures and is known for its tissue-engineering properties. Our objective was to introduce antimicrobial attribute to KLD which would help in preventing secondary infection associated with external application of such tissue engineering materials. Considering the net charge of KLD-12, varying number of cationic arginine residues were added to its N-terminus. KLD variants showed appreciable bactericidal properties without any significant increase in cytotoxicity against tested mammalian cells. Further, these variants adopted β-sheet structures and self-assembled into nano-structures comparable to that of KLD. Interestingly, the KLD variants with two (KLD-2R) and three (KLD-3R) arginine residues added to its N-terminus showed significant osteogenic effect which was comparable or better than the original peptide as evident from the alkaline phosphatase activity assay, mineralized nodule formation and expression of different osteogenic genes. Particularly, application of KLD-2R in rats to the site of a drill-hole (0.8 mm diameter) that was created in the femur metaphysis displayed significantly higher bone regeneration compared to that of KLD. The results demonstrate a simple way to improve biological property of a self-assembling peptide with tissue engineering property.

5. **Inhibition of NADPH oxidase-4 potentiates 2-deoxy-d-glucose induced suppression of glycolysis, migration and invasion in glioblastoma cells : Role of the Akt / HIF1α / HK-2 signaling axis,** (Gupta P, Jagavelu K, Mishra DP, ***Antioxid Redox Signal***, [Epub ahead of print] **IF: 7.667**)

2-DG, a synthetic glycolytic inhibitor is currently under clinical evaluation as a promising anti-cancer agent. However, 2-DG treatment in cancer cells activates pro-survival Akt signaling, that might limit its clinical efficacy. The NADPH oxidase 4 (Nox-4)/ROS/Akt signaling is known to regulate survival, proliferation infiltration and invasion in glioblastomas (GBMs). The enhanced motility, invasiveness and therapy resistance in GBMs is attributed to metabolic adaptation through increased aerobic glycolysis. Therefore, we hypothesized that inhibition of the Nox-4 might enhance 2-DG induced suppression of glycolysis, migration and invasion in GBM cells. We identified the natural napthaquinone compound Shikonin as a potent inhibitor of the Nox-4/Akt signaling pathway. The combined treatment of shikonin+2-DG suppressed the glycolytic phenotype, migration and invasion through modulation of the Akt/HIF1α/HK-2 signaling axis in GBM cells. The combination also exhibited enhanced anti-proliferative and anti-angiogenic effects *in vivo*. Our data for the first time demonstrates that inhibition of the Nox-4 associated pro-survival signaling pathway by shikonin enhances the anti-proliferative and anti-angiogenic potential of 2-DG in GBM cells. In summary, the combined inhibiton of Nox-4 and glycolysis may have therapeutic implications for the management of GBMs.

6. **β-Cyclodextrin catalysed C–C bond formation *via* C(sp3)–H functionalization of 2-methyl azaarenes with diones in aqueous medium,** (Atul Kumar and Ratnakar Dutt Shukla, ***Green Chemistry***,17, 848-851, **IF: 6.852**)



The first β-cyclodextrin catalysed C(sp3)–H functionalization of 2-alkyl-azaarenes with homocyclic as well as heterocyclic diones in water has been developed. This biomimetic catalyst oriented methodology provides a sustainable and green protocol for C–H functionalization, an area mainly dominated by transition metals.

New Projects Undertaken

Grant-in-Aid Projects

1. Studies on the interactions between mycobacteria and host defence peptides

The main aims of the project are to develop novel host defence peptides (HDPs) which are potent against both active and latent stages of *Mycobacterium tuberculosis* infections. We are also interested in understanding the structural prerequisites required for HDPs to be activity against *Mycobacterium tuberculosis*. Furthermore, we want to investigate the peptide effects on mycobacteria present in the macrophage, and modulatory effects on host defence during infection. We strongly believe that the proposed project will provide significant opportunities for development of novel and highly effective peptide based antimycobacterial therapeutics of high clinical need.

PI: Dr. Mukesh Pasupuleti

Co PI : YK Manju

Funding Agency: DBT

Date of Start: 01.10.2014

Expected Date of Completion: 30.09.2017

2. Exploration of Interleukin 1 receptor associated kinase (IRAK) family of kinases during macrophage foam cell formation and inflammation

This project aims to unravel new mechanisms involved in macrophage lipid accumulation and inflammation. This will have therapeutic implications for Atherosclerosis treatment. Project will establish any novel cross talk between monocyte/macrophage inflammatory and lipid accumulation pathways and role of IRAK family of proteins in the same.

PI: Dr. Manoj Kumar Barthwal

Co PI: Dr. Madhu Dikshit

Funding Agency: DBT

Date of Start: 22.10.2014

Expected Date of Completion: 22.10.2017

3. Molecular and functional characterization of MAP Kinase1 homologue of *Leishmania donovani*

MAP kinases (MAPK), the furthest downstream kinases in signal transduction cascades, regulate critical cellular activities such as cell proliferation, differentiation, mortality, stress response and apoptosis. In Leishmania, MAPK1 has been shown to play roles in parasite differentiation and survival within host macrophages. Recently from our lab, MAPkinase-1 homologue has been shown to have a role in clinical antimony resistance. Keeping in view, the various roles played by MAPK1 and lack of detailed information on this MAP kinase in parasite, the present project is planned to characterize MAPK1 and its associated proteins in *Leishmania donovani*, the causative agent of Indian kala-azar.

PI: Dr. Neena Goyal

Funding Agency: DST

Date of Start: 01.01.2015

Expected Date of Completion: 31.12.2017

4. Understanding the role of Heat Shock Proteins (HSPs) in *Plasmodium falciparum* survival during stress conditions

Plasmodium falciparum has evolved efficient protein folding machinery to prevent misfolding and disaggregation of its insoluble proteome. The striking divergence of PfHSP110 hints towards its role in maintenance of proteome stability. Thus, we would address the following questions: (i) Is PfHSP110 more efficient in folding and refolding proteins in comparison to its yeast or human homolog and map its interaction interface. (ii) What are the in vivo client proteins of PfHSP110. This study will give insights into mechanistic role of PfHSP110 and allow design of specific ligands which could block the interaction of HSP110 with components of protein folding machinery.

Dr. Niti Kumar

Funding Agency: INSA

Date of Start: 01.01.2015

Expected Date of Completion: 31.12.2017

5. Exploration, identification and isolation of bone fracture healing agents from Indian folk traditional plants *Pholidota articulate* and *Coelogyn cristata* (Orchidaceae)

Indian folk traditional plants *Pholidota articulate* and *Coelogyn cristata* (Orchidaceae) are known to rich in medicinal value. The objective of current research project is to explore bone fracture healing agents from these plants and to identify and isolate the active molecules.

PI: Dr. K. R. Arya

Co PI: Dr. Brijesh Kumar, Dr. T. Narender, Dr. Divya Singh

Funding Agency: AYUSH

Date of Start: 31.12.2014

Expected Date of Completion: 31.12.2017

6. Integrated 3D molecular modelling, design and synthesis of Novel Chemical Entities (NCEs) as potential agents for the treatment of Alzheimer disease

Alzheimer disease is becoming more common in India. The major objective of this project is to design and synthesize the Novel Chemical Entities (NSEs) using Integrated 3D molecular modelling for the treatment of Alzheimer disease.

Dr. A.K. Saxena (Emeritus Scientist)

Funding Agency: CSIR

Date of Start: 01.05.2014

Expected Date of Completion: 30.04.2017

7. Molecular and biochemical characterization of chaperonin class of heat shock proteins of *Leishmania donovani*, their exploration as drug target

Under the environmental stresses, all organisms examined to date respond with the synthesis of a subset of chaperone molecules, the heat-shock proteins (Hsps) which play an important role in protein folding, assembly, secretion and regulation of other proteins. Trypanosomatids including Leishmania, express large number of heat shock proteins However, the presence and role of Hsp60 or chaperonin or TCP complex in parasites of kinetidoplastida family is still open to study. Present project is aimed to characterize TCP1g gene of *Leishmania donovani*. These studies are required to establish its role in parasite differentiation and resistance, if any and also to explore its potential as drug target.

Funding Agency: DBT

Dr. Neena Goyal

Date of Start: 24.12.2014

Expected Date of Completion: 23.12.2017

8. Studies on bicyclic iminosugar enzyme inhibitors and total synthesis of N-heterocyclic natural products and natural product like molecules from carbohydrate chirons

The objective of this project is to study the bicyclic iminosugar enzyme inhibitors and to explore the methods for total synthesis of N-heterocyclic natural products and natural product like molecules from carbohydrate chirons.

Funding Agency: DST

PI: Dr. AK Shaw

Co. PI: Dr. YS Prabhakar

Date of Start: 24.03.2015

Expected Date of Completion: 23.03.2018

9. Quest for corannulene based polyfunctional molecules in nanobiotechnology and nanomedicine: Transporting and translocating properties of corannulene derived carrier systems

The present proposal concerns novel and efficient carrier-based delivery systems (dendrimers and peptides) based on molecular bowl corannulene. The well-known anti-cancer drug, which carries the serious drawbacks of toxicities and short retention time in cancer cells, will be attached with corannulene based carrier to enhance the cellular uptake and cellular retention of the parent drug for sustained anticancer activity. The Corannulene-drug conjugate will then be evaluated for its physicochemical and biological properties and will include the stability testing of the derived conjugates, MTT and cell cycle analysis assays, Apoptosis analysis, Mitochondrial membrane potential testing, Western blotting and Topo II Decatenation Assay. Based on the favorable results from these methods, further testing will be done for breast cancer with MDA-MB231 cells transplanted on animal tumor model and finally organ distribution of the corannulene, drug alone, and corannulene-drug conjugates will be performed.

Funding Agency: DST

PI: Dr. Gautam Panda

Date of Start: 24.03.2015

Expected Date of Completion: 23.03.2018

Some Important Publications

(October 2014 - March 2015)

Biological Sciences

Title	Author	Journal	Volume/Issue Page No.	Impact factor 2014
Pathophysiological mechanism of bone loss in type 2 diabetes involves inverse regulation of osteoblast function by PPARγ coactivator-1α and skeletal muscle atrogenes: adiponectin receptor 1 as a potential target for reversing diabetes-induced osteopenia	Khan MP, Singh AK, Joharapurkar AA, Yadav M, Shree S, Kumar H, Gurjar A, Mishra JS, Chandra Tiwari M, Nagar GK, Kumar S, Ramachandran R, Sharan A, Jain MR, Trivedi AK, Maurya R, Godbole MM, Gayen JR, Sanyal S, Chattopadhyay N.	DIABETES	64(7), 2609-23	8.474
Variants of self-assembling peptide, KLD-12 that show both rapid fracture healing and antimicrobial properties	Tripathi JK, Pal S, Awasthi B, Kumar A, Tandon A, Mitra K, Chattopadhyay N, Ghosh JK.	BIOMATERIALS	56, 92-103	8.312
Inhibition of NADPH oxidase-4 potentiates 2-deoxy-d-glucose induced suppression of glycolysis, migration and invasion in glioblastoma cells : Role of the Akt / HIF1α / HK-2 signaling axis	Gupta P, Jagavelu K, Mishra DP.	ANTIOXID REDOX SIGNAL.	PMID: 05891245 [Epub ahead of print]	7.667
Antigen presenting cells targeting and stimulation potential of lipoteichoic acid functionalized lipo-polymerosome: A Chemo-Immunotherapeutic approach against intracellular infectious disease	Gupta PK, Jaiswal AK, Asthana S, Dube A, Mishra PR.	BIOMACRO-MOLECULES	6(4):1073-87	5.788
L-plastin S-glutathionylation promotes reduced binding to β-actin and affects neutrophil functions.	Dubey M, Singh AK, Awasthi D, Nagarkoti S, Kumar S, Ali W, Chandra T, Kumar V, Barthwal MK, Jagavelu K, SÃ¡nchez FJ, Lamas S, Dikshit M.	FREE RAD. BIO. MED.	doi:pii: S0891-5849(15)00170-7. 10.1016/j.freeradbiomed. 2015.04.008. [Epub ahead of print])	5.71
Involvement of Interleukin-1 Receptor-Associated Kinase-1 in vascular smooth muscle cell proliferation and neointimal formation after rat carotid injury.	Jain M, Singh A, Singh V, Barthwal MK.	ARTERIOSCLER THROMB. VASC. BIOL.	doi:pii:ATVBAHA.114.305028. [Epub ahead of print]	5.533

Nitroimidazo-oxazole compound DNDI-VL-2098: an orally effective preclinical drug candidate for the treatment of visceral leishmaniasis	Gupta Suman, Yardley Vanessa, Vishwakarma Preeti, Shivahare Rahul, Sharma Bhawna, Launay Delphine, Martin Denis, Puri Sunil K	JOURNAL OF ANTIMICROBIAL CHEMOTHERAPY	70(2), 518-527	5.439
Role of MicroRNA Let-7 in Modulating Multifactorial Aspect of Neurodegenerative Diseases: an Overview.	Shamsuzzama, Kumar L, Haque R, Nazir A.	MOL NEUROBIOL.	PMID: 25823513 [Epub ahead of print]	5.286
Streptozotocin Induced Neurotoxicity Involves Alzheimer's Related Pathological Markers: a Study on N2A Cells.	Biswas J, Goswami P, Gupta S, Joshi N, Nath C, Singh S.	MOL NEUROBIOL.	PMID: 25823512 [Epub ahead of print]	5.286

Chemical Sciences

Title	Author	Journal	Volume/Issue Page No	Impact Factor-2014
Crystal Structure and Prediction	Thakur Tejender S, Dubey Ritesh, Desiraju Gautam R	ANNUAL REVIEW OF PHYSICAL CHEMISTRY	66, 21-42	15.678
Palladium-Catalyzed Regio- and stereoselective cross-addition of Terminal Alkynes to Ynol ethers and synthesis of 1,4-Enyn-3-ones	Babu Madala Hari, Dwivedi Vikas, Kant Ruchir, Reddy Maddi Sridhar	ANGEWANDTE CHEMIE-INTERNATIONAL EDITION	54(12),3783-3786	11.336
Thiol-Ene click reaction triggered by neutral ionic liquid: The ambiphilic character of [hmim]br in the regioselective nucleophilic hydrothiolation	Kumar Rajesh, Saima Shard Amit, Andhare Nitin H, Richa Sinha, Arun K	ANGEWANDTE CHEMIE-INTERNATIONAL EDITION	54(3), 828-832	11.336
beta-Cyclodextrin catalysed C-C bond formation via C(sp(3))-H functionalization of 2-methyl azaarenes with diones in aqueous medium	Kumar Atul, Shukla Ratnakar Dutt	GREEN CHEMISTRY	17(2), 848-851	6.852
A dual colorimetric-ratiometric fluorescent probe NAP-3 for selective detection and imaging of endogenous labile iron(III) pools in C. elegans	Goel Atul, Umar Shahida, Nag Pankaj, Sharma Ashutosh, Kumar Lalit, Shamsuzzama, Hossain Zakir, Gayen Jiaur R, Nazir Aamir	CHEMICAL COMMUNI-CATIONS	51(24), 5001-5004	6.718
Transition-Metal-Free C-3 Arylation of Quinoline-4-ones with Arylhydrazines.	Ravi M, Chauhan P, Kant R, Shukla SK, Yadav PP	JOURNAL OF ORGANIC CHEMISTRY	doi: [Epub ahead of print]	4.638
Regioselective metal-free decarboxylative multicomponent coupling of a-Amino Acids, aldehydes and Isonitriles leading to n-substituted azacyclic-2-carboxamides with antithrombotic activity	Dighe Shashikant U, Kumar Anil KS, Srivastava Smriti, Shukla Pankaj, Singh Surendra, Dikshit Madhu, Batra Sanjay	JOURNAL OF ORGANIC CHEMISTRY	80(1), 99-108	4.638

PATENTS

Patents Granted Abroad

1. **United States Patent No.:** 8946261 **Date of Grant:** 03.02.2015

   Title: Substituted 1, 2, 3, 4-tetrahydroquinolin-7-yl carbamates, their preparation, and use thereof as acetylcholinesterase (ache) inhibitors for the treatment of alzheimer's and other neurodegenerative disease

   Inventors: Kuldeep Kumar Roy, Santoshkumar Tota, Chandishwar Nath, Rakesh Shukla & Anil Kumar Saxena

   Supporting Staff: Zahid Ali & Arimardan Singh Kushwaha

2. **United States Patent No.:** 8946682 **Date of Grant:** 03.02.2015

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

   Inventors: Atul Goel, Sumit Chaurasia, Vijay Kumar, Sundar Manoharan & RS Anand

3. **United States Patent No.:** 89215417 **Date of Grant:** 30.12.2014

   Title: Method of treating dyslipidemia using naturally occurring diterpene

   Inventors: Koneni Venkata Sashidhara, Anju Puri & Jammikuntla Naga Rosaiah

   Supporting Staff: Suriya Pratap Singh, Jai Kumar joshi, Noor Jehan, KK Yadav, Devidutt & Ram Jivan

4. **United States Patent No.:** 8815940 **Date of Grant:** 26.08.2014

   Title: Coumarin-chalcones as anticancer agents

   Inventors: Koneni Venkata Sashidhara, Abdhesh Kumar, Manoj Kumar, Jayanta Sarkar & Sudhir Kumar Sinha

   Supporting Staff: Sanjeev Meena

Patents Filed Abroad

1. **PCT Application No.:** PCT/IN2015/000076 **Date of Filing:** 09.02.2015

   Title: Substituted Naphtho[2,1-b][1,10]phenanthroline based fluorescent dyes and application thereof

   Inventors: Atul Goel, Shahida Umar, Pankaj Nag, Aamir Nazir, Lalit Kumar, Shamsuzzama, Jiaur Rahaman Gayen & Zakir Hossain

2. **United States Application No.:** 14/382428 **Date of Filing:** 02.09.2014

   Title: NEF-ASK1 interaction inhibitor as novel anti-HIV therapeutics

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

3. **PCT Application No**.: PCT/IN2014/000556 **Date of Filing**: 29.08.2014

   Title: Novel aryl naphthyl methanone oxime derivatives for the treatment of hematological malignancies and solid tumors

   Inventors: Sabyasachi Sanyal, Atul Kumar, Naibedya Chattopadhyay, Jawahar Lal, Arun Kumar Trivedi, Dipak Datta, Srikanta Kumar Rath, Tahseen Akhtar, Shailendra Kumar Dhar Dwivedi, Monisha Yadav, Bandana Chakravarti, Abhishek Kumar Singh, Jay Sharan Mishra, Nidhi Singh & Anil Kumar Tripathi

Patents Granted in India

1. **Patent No.:** 265054 **Date of Grant:** 04.02.2015

Title: Novel cyclopropa [a]naphthalenes and a process for the preparation their of

Inventors: Atul Goel, Fateh Veer Singh, Puja Garg, Preeti Dohare & Madhur Ray

Patents Filed in India

1. **Patent Application No.:** 0125DEL2015 **Date of Filing:** 15.01.2015

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

2. **Patent Application No.** 3716DEL2014 **Date of Filing**: 16.12.2014

Title: Semicarbazone based chalcones as potent anticancer agents

Inventors: Koneni Venkata Sashidhara, Dipak Datta, Jiaur Rahman Gayen, Avula Srinivasa Rao, Akhilesh Singh, Srikanth Hanumanth Cheruvu, Ravithej Singh, Gopala Reddy Palnati, Shrankhla Maheshwari, Rakesh Kumar Arya & Anup Kumar Singh

Supporting Staff: Sanjeev Meena

3. **Patent Application No**. 2865DEL2014 **Date of Filing**: 08.10.2014

Title: New Rapamycin conjugates and process for preparation

Inventors: Wahajul Haq & Rafat Ali

4. **Patent Application No.** 2773DEL2014 **Date of Filing:** 29.09.2014

Title: A formulation useful for delivery of neuroprotecting agent

Inventors : Anil Kumar Dwivedi, Hafsa Ahmad, Kiran Kumar Khandelwal, Neelam Singh Sangwan, Jiaur Rahman Gayen,Smrati Bhadauria, 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. **Patent Application No.** 2726DEL2014 **Date of Filing:** 23.09.2014

Title: Linear cationic antimicrobial peptides and process for preparation thereof

Inventors: Tushar Kanti Chakraborty, Sudip Pal, Uttam Ghosh, Sudhir Sinha & Sidharth Chopra

Supporting Staff: Shyam Singh

6. **Patent Application No.**1983DEL2014 **Date of filing:** 15.07.2014

Title: Novel combination kit for the treatment of Malaria

Inventors: Renu Tripathi, Prabhat Ranjan Mishra, Pankaj Dwivedi, Hemlata Dwivedi, Sunil Kumar Singh, Sunil Ku mar Puri & Anil Kumar Dwivedi

Honours & Awards

Dr. Anuradha Dube
Elected Fellow of the Indian Academy of Sciences, Bengaluru 2014

Dr. Madhu Dikshit
- VASVIK Smt. Chandaben Mohanbhai Patel Industrial Research Award for Women Scientists – 2012
- GJS Rao Memorial Lecture Award - 2014 Biochemistry Department, Indian Institute of Sciences, Bengaluru

Dr. RP Tripathi
Elected Fellow of the Association of Carbohydrate Chemists & Technologists (India) 2014

Dr. PMS Chauhan
Prof. SP Hiremath Award 2014, Indian Council of Chemists

Dr. Jiaur R. Gayen
ICMR International Fellow 2014-15, ICMR, India

Dr. Wahajuddin
DEF Young Scientist Award Academy of Environmental Biology

Dr. Rabi Sankar Bhatta
INSA International Colloboration / Exchange Programme 2014-15, INSA, India

Dr. C. Nath
Prof KP Bhargava Oration Award -2014 by Dept of Pharmacology, KG Medical University, Lucknow

Dr. Sripathi R. Kulkarni
Spangenberg Fellow for Law & Technology for the year 2015-16 by School of Law, Case Western Reserve University, Cleveland, Ohio, USA

Mr. Karunesh Rai
Dr. K.R. Bhardwaj Award 2013- 14 in Lab Animal Sci., Laboratory
Animal Science Association of India

Mr. Ajay Kumar Jha (Student of Dr. Atul Goel)
Best Poster Award Presented at Humboldt Academy of Lucknow, Lucknow

Mr. Saurabh Agnihotri (Student of Dr. Monika Sachdev)
3rd Prize in Best Poster Award Indian Society for the Study of Reproduction & Fertility-2014

Mr. Abhishek K Singh (Student of Dr. Madhu Dikshit)
TCS-BC Award, 2014 The Cytometry Society India

Mr. Sanjay C Rebello (Student of Dr. Madhu Dikshit)
Lord Sreenivasa of Seven Hills Gold Medal for Best Original Paper 2014, Indian Society for Atherosclerosis Research

Mr. Subhash Dwivedi (Student of Dr. Rakesh Shukla)
2nd Best Oral Presentation Award Kolkata Neuroscience Conference 2014, IICB, Kolkata

Mr. Manish Charan (Student of Dr. Saman Habib)
2nd Prize for Best Poster Presentation in Xth Joint Annual Conference of ISMOCD and IAE, Goa

Ms. Jyoti Kureel (Student of Dr. Divya Singh)

Young Investigator Award by International Osteoporosis Foundation (IOF), Orlando, USA

Ms. Isha Kapoor (Student of Dr. Arun Kumar Trivedi)

Best Poster Award at International conference in cancer and Stem cells 2014

Ms. Hafsa Ahmad (Student of Dr. AK Dwivedi)

- Selected as National student in the 1st IBRO/ APRC, Punjab University, Chandigarh
- Best oral presentation award, in National conference on Drug Carriers in Medicine and Biology, Erode, Tamilnadu

Ms. Shubhra Singh (Student of Dr. Vinita Chaturvedi)

Fellowship of the Raman Charpak under the Indo-French collaboration for the promotion of Advanced Research.

Ms. Sarika Gunjan (Student of Dr. Renu Tripathi)

Best Poster Presentation Award in 25th National Congress of Parasitology 2014, CSIR-CDRI, Lucknow

Mr. Vineet Kumar Maurya (Student of Dr. Rajesh K Jha)

2nd Best poster award, 24th annual meeting of Indian Society for the Study of Reproduction and Fertility (ISSRF-2014)

Ms. Renu Pandey (Student of Dr. Brijesh Kumar)

1st Best Poster Award, National Seminar on "Applications of Mass and NMR Techniques in Drug Research" 2014, Lucknow

Ms. Preeti Chandra (Student of Dr. Brijesh Kumar)

2nd Best Poster Award National Seminar on "Applications of Mass and NMR Techniques in Drug Research" 2014, Lucknow

Ms Tripti Joshi (Student of Dr Sanjeev Kanojiya)

3rd Best Poster Award "Applications of Mass and NMR Techniques in Drug Research" 2014, Lucknow

Mr. Hardik Chandasana (Student of Dr. Rabi S. Bhatta)

2nd Best Poster Award at Applied Pharmaceutical Analysis Conference 2014, Ahmedabad.

Dr. Pooja Jadiya (Student of Dr. Aamir Nazir)

63th Meeting of Nobel Laureates & Students at Lindau 2014, Germany by Department of Science and Technology (Government of India) and Lindau Council.

Mr. Rizwanul Haque (Student of Dr. Aamir Nazir)

Best poster presentation in symposium entitled "Current Scenario in Drug Discovery & Development" in NIPER, Raebareli

Ms. Manisha Pathak (Student of Dr. Shailja Bhattacharya)

Best Poster Award in 25th National Congress of Parasitology, 2014, CSIR-CDRI, Lucknow

Mr. Pawan Kumar Yadav (Student of Dr. Susanta Kar)

Best Poster Award in X Joint Annual Conference of ISMOCD & IAE

Ms. Preeti Vishwakarma (Student of Dr. Susanta Kar)

Best Poster award in 25th National Congress of Parasitology, 2014, CSIR-CDRI, Lucknow

CDRI Incentive Awards 2015

Best Patents Award

1. **United States Patent No.:** 89215417 **Date of Grant:** 30.12.2014

   Title: Method of treating dyslipidemia using naturally occurring diterpene

   Inventors: Koneni Venkata Sashidhara, Anju Puri & Jammikuntla Naga Rosaiah

   Supporting Staff: Suriya Pratap Singh, Jai Kumar joshi, Noor Jehan, K.K. Yadav, Devidutt & Ram Jivan

2. **United States Patent No.:** 8815940 **Date of Grant:** 26.08.2014

   Title: Coumarin-chalcones as anticancer agents

   Inventors: Koneni Venkata Sashidhara, Abdhesh Kumar, Manoj Kumar, Jayanta Sarkar & Sudhir Kumar Sinha

   Supporting Staff: Sanjeev Meena

3. **United States Patent No.:** 8686028 **Date of Grant:** 01.04.2014

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

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

   Supporting Staff: Abdul Malik & Avinash Kumar

CDRI Students Awards

1. **Dr. Veenu Bala** (Student of Dr. VL Sharma)

   Dr. MM Dhar Memorial Distinguished Career Achievement Award-2015 (Chemical Sciences)

2. **Dr. Avinash Kumar** (Student of Dr. Ritu Trivedi)

   Dr. MM Dhar Memorial Distinguished Career Achievement Award-2015 (Biological Sciences)

3. **Dr. Yashpal Singh Chhonker** (Student of Dr. RS Bhatta)

   Dr. JM Khanna Memorial Distinguished Career AchievementAward-2015 (Pre-clinical & Clinical Sciences)

4. **Mr. Vivek Kumar Pawar** (Student of Dr. Manish Kumar Chourasia)

   Dr. JM Khanna Memorial Early Career Achievement Award 2015

5. **Ms. Samriddhi Shukla** (Student of Dr. Syed Musthapa Meeran)

   Dr. Swarn Nitya Anand Memorial Early Career Achievement Award 2015 for Women Research Scholars

Incentive Awards for the best Papers published in 2014 by CDRI Scientists

Category I (IF > 10)

1. Organocatalytic Asymmetric Mannich Cyclization of Hydroxylactams with Acetals: Total Syntheses of (–)-Epilupinine, (–)-Tashiromine, and (–)-Trachelanthamidine, Koley D, Krishna Y, Srinivas K, Khan AA and Kant R, ***Angew. Chem. Int. Ed.***, 53 (48),13196-13200, **IF: 11.336**

Category II Biology (IF > 6.5-10)

2. Orally Active Osteoanabolic Agent GTDF Binds to Adiponectin Receptors, With a Preference for AdipoR1, Induces Adiponectin-Associated Signaling, and Improves Metabolic Health in a Rodent Model of Diabetes, Singh AK, Joharapurkar AA, Khan MP, Mishra JS, Singh N, Yadav M, Hossain Z, Khan K, Kumar S, Dhanesha NA, Mishra DP, Maurya R, Sharma S, Jain MR, Trivedi AK, Godbole MM, Gayen JR, Chattopadhyay N and Sanyal S, ***Diabetes***, 63 (10) 3530-3544, **IF: 8.474**

3. Interaction of Inducible Nitric Oxide Synthase with Rac2 Regulates Reactive Oxygen and Nitrogen Species Generation in the Human Neutrophil Phagosomes: Implication in Microbial Killing, Jyoti A, Singh AK, Dubey M, Kumar S, Saluja R, Keshari RS, Verma A, Chandra T, Kumar A, Bajpai VK, Barthwal MK and Dikshit M, ***Antioxidants & Redox Signaling***, 20(3), 417-431, **IF:7.667**

4. Nanoemulsion Based Concomitant Delivery of Curcumin and Etoposide: Impact on Cross Talk Between Prostate Cancer Cells and Osteoblast During Metastasis, Shukla P, Mathur V, Kumar A, Khedgikar V, Teja BV, Chaudhary D, Kushwaha P, Bora HK, Konwar R, Trivedi R and Mishra PR, ***Journal of Biomedical Nanotechnology***, 10(11), 3381-3391, **IF:7.578**

5. Immunotherapeutic vitamin E nanoemulsion synergies the antiproliferative activity of paclitaxel in breast cancer cells via modulating Th1 and Th2 immune response, Pawar VK, Panchal SB, Singh Y, Meher JG, Sharma K, Singh P, Bora HK, Singh A, Datta D and Chourasia MK, ***J. Controlled Rel.***, 196, 295-306, **IF:7.261**

6. Macrophages are recruited to hypoxic tumor areas and acquire a Pro-Angiogenic M2-Polarized phenotype via hypoxic cancer cell derived cytokines Oncostatin M and Eotaxin, Tripathi C, Tewari BN, Kanchan RK, Baghel KS, Nautiyal N, Shrivastava R, Kaur H, Bhatt ML and Bhadauria S, ***Oncotarget***, 5(14) 5350-68, **IF:6.627**

7. Enhanced Immunoprotective Effects by Anti-IL17 Antibody Translates to Improved Skeletal Parameters Under Estrogen Deficiency Compared to Anti-RANKL and Anti-TNFα Antibodies, Tyagi AM, Mansoori MN, Srivastava K, Khan MP, Kureel J, Dixit M, Shukla P, Trivedi R, Chattopadhyay N and Singh D, ***Journal of Bone And Mineral Research***, 29(9) 1981-1992, **IF:6.589**

Category II Chemistry (IF > 6-10)

8. Substituent controlled reactivity switch: selective synthesis of α- diazoalkylphosphonates or vinylphosphonates via nucleophilic substitution of alkyl bromides with Bestmann-Ohira reagent, Pramanik MMD, Chaturvedi AK and Rastogi N, ***Chemical Communications***, 50, 12896-12898, **IF:6.718**

9. New fluoranthene FLUN-550 as a fluorescent probe for selective staining and quantification of intracellular lipid droplets, Goel A, Sharma A, Kathuria M, Bhattacharjee A, Verma A, Mishra PR, Nazir A and Mitra K, ***Organic Letters***, 16(3) 756-759, **IF:6.324**

10. Copper(II) Catalyzed Expeditious Synthesis of Furoquinoxalines through a One-Pot Three-Component Coupling Strategy, Gunaganti N, Kant R and Narender T, ***Organic Letters***, 16(17) 4528-4531, **IF:6.324**

11. Tandem C-2 Functionalization-Intramolecular Azide-Alkyne 1,3-dipolar Cycloaddition Reaction: A Convenient Route to Highly Diversified 9H-benzo[b]pyrrolo [1,2-g][1,2,3]triazolo[1,5-d][1,4] diazepines, Hussain MK, Ansari MI, Kant R and Hajela K, ***Organic Letters***, 16(2) 560-563, **IF:6.324**

12. Furan based Locked Z-Vinylogous γ-Amino Acid Stabilizing α-Turn in Water-Soluble Cyclic α3γ Tetrapeptides, Krishna Y, Sharma S, Ampapathi RS and Koley D, ***Organic Letters***, 16(8) 2084-2087, **IF:6.324**

13. Iodo Meyer"Schuster Rearrangement of 3-Alkoxy-2-yn-1-ols for β-Mono (Exclusively Z-Selective)-/Disubstituted α-Iodo-α,β-Unsaturated Esters, Puri S, Thirupathi N and Reddy MS, ***Organic Letters***, 16, 5246-5249, **IF:6.324**

14. Palladium-Catalyzed Tandem Intramolecular Oxy/Amino-Palladation/Isocyanide Insertion: Synthesis of α Benzofuranyl/Indolylacetamides, Thirupathi N, Babu MH, Dwivedi V, Kant R and Reddy MS, ***Organic Letters***, 16, 2908-2911, **IF:6.324**

BUSINESS DEVELOPMENT ACTIVITIES

Details	Client/Collaborator	Date of Signing the agreement
Memorandum of Understanding signed for joint R&D		
Non-ionizing radiation induced alteration in molecular signaling of ovulation and embryo implantation in mice model	Banaras Hindu University, Varanasi	08.09.2014
Cybernetics of platelet-rich fibrin (PRF) mediated regulation of human gingival fibroblasts (HGF).	King George Medical University, Lucknow	16.09.2014
Antimicrobial resistance analysis of gram-negative bacterial isolates from Micro-JNMC	Aligarh Muslim University, Aligarh	23.09.2014
Mesenchymal stem cells with a polymeric scaffold may improve cardiac function in a mouse myocardial model	IIT, Madras, Chennai	08.10.2014
Decoding the ncRNome & Epigenome for Breast Cancer using Big Data analytics on Next Generation Sequencing	IIIT, Allahabad	07.11.2014
Validation of wnt pathway modulation and efficacy study in primary osteoporosis, fracture healing and secondary osteoporosis models for repositioning of clofazimine	King Georges Medical University, Lucknow	15.12.2014
Study of antioxidant and molecular mechanism for anti HIV activities of some plant products	University of Allahabad, Allahabad	04.02.2015
Dissecting role of critical miRNA in breast cancer in Indian subjects	King Georges Medical University, Lucknow	23.02.2015
IP Search and Analysis Services	CSIR-URDIP, Pune	19.03.2015
Memorandum of Agreement		
An approach towards identification and synthesis of antigenic epitopes of potential *L. donovani* Th1 stimulatory proteins for the development of synthetic vaccine against Visceral Leishmaniasis	DBT, New Delhi	14-10-2014
Secrecy Agreement		
CSIR-CDRI compound rac-1068 as a elective GLP-1 agonist	Cadila Healthcare Ltd., Ahmedabad	24.09.2014
A CSIR-CDRI formulation inhalable microparticles containing isoniazid and rifabutin	Camus Pharma Pvt. Ltd., Jaipur	13.10.2014
Standardized fraction of Plant 4655 (K09) as Anti-dyslipidemic and antiobesity properties	Charak Pharma Pvt. Ltd. Mumbai	02.02.2015
Eutectic mixture of zolmitriptan	Dr. Reddy's Laboratories Ltd., Hyderabad	17.02.2015

Evaluation License Agreement		
Evaluation agreement of the softwares Gold Suites (Gold 5.2,Goldmine 1.5 and Hermes 1.6)	CCDC Software Limited, Cambridge, UK	09.09.2014
Material Transfer Agreement		
Plasmids 13331:pBmm42, 13332:pDR119, 35027:pShuttle FEN1hWT,10792: 1436pcDNA3 Flag HA & 22893:pcDNA-Flag-RPA2	Addgene, USA	12.09.2014
DTP Plated Compounds: Approved Oncology Drugs Set 10mM Diversity Set 10mM Natural Products Set 1mM Mechanistic Set	NIH/National Cancer Institute, USA	12.09.2014
Bacterial expression plasmid pRsetA (back bone) with a His tag and U1p1, plasmid pET (back bone) with SUMO and His tag (control plasmid)	Addgene, USA	18.09.2014
Cancer cell lines HT-29, Hela, MCF-7, MDA-MB-453, ZR-75-1, ZR-75-30, T47-D.	Curator, Cell Repository, NCCS, Pune	29.09.2014
Plasmids: 42230: pX330-U6-Chimeric_BB-CBh-hSpCas9 and 4810:pSpCas9n(BB)-2A-GFP (PX461)	Addgene, USA	10.10.2014
ParM(His6/I27C/K33A/T174A/T175N/C287A) mutant in pJSC1 vector	MRC National Institute for Medical Research, England	17.10.2014
Plasmid DNA transient transfections in cells: pCMV-Caspase1-flag,mTLR4 flag, mTLR4, hTLR4, MYD88 flag, pCMV-HA-MyD88, pAAV/D374Y-hPCSK9, pCDNA3 flag p38 alpha, pcDNA3-HA-ERK2 WT, GFP-ERK1, pCDNA flag Jnk1a1, pCDNA3 flag Jnk2a1.	Addgene, USA	12.11.2014
mEmerald-plastin-N-10	Addgene, USA	10.12.2014
Transfected cell lines MDCK- ABCB1 (MDR1), MDCK-ABCG2 (BCRP), MDCK-ABCC2 (MRP2)	The Netherlands Cancer Institute, Amsterdam	12.02.2015
34686: wt dynamic 2 pEGFP,41392: pLEX_307, 16398: BJ5183 cells, 16399: AdEasier-1 cells (strains) 16400: pAdEasy-1, 16403:pShuttle-CMV 16405:pAdTrack-CMV	Addgene, USA	25.02.2015
Polyclonal antibodies developed against MAPK1 of *L. donovani* in rabbit	Institute of Tropical Medicine, Belgium	03.03.2015

Major Events Organized

Workshop on Mass Spectrometry and NMR techniques

SAIF, CDRI has organized a Workshop on the applications of Mass and NMR techniques from September 22 -23 2014. Total 32 participants from different parts of India came to attend the workshop. The speakers and application people were all experts and had delivered the current state of art mass spectrometry techniques with the highlights of hot topics and potential future course of advances in mass spectrometry. The workshop provided a golden opportunity to experience the state of the art mass and NMR techniques.

CSIR Foundation Day Celebrations

CSIR-Central Drug Research Institute celebrated the 72nd CSIR Foundation Day on September 24, 2014. **Padmashri Prof. Vinod Kumar Singh,** Director, Indian Institute of Science Education & Research (IISER), Bhopal graced the occasion as Chief Guest and presented his distinguished work entitled "Organic Synthesis: From Creativity to Sustainability and Human Well-being". Further mementoes were given to colleagues completing 25 years of service in CSIR and to colleagues superannuated during Sep 2013 Aug 2014.Thereafter Prof. Vinod Kumar Singh along with other dignitaries on dais released CSIR-CDRI Newsletter (Vol.6 No.1, April to September,2014). Prizes were awarded to the children of CSIR employees who secured more than 90% marks in Science subjects during inter mediate board exams. The prizes were also given to the winners of essay competition organised during the foundation day celebration.

Prestigious CSIR-CDRI Awards 2014 were bestowed to the selected winners after their award oration. Under Chemical Sciences the award was conferred to **Dr. Srinivas Hotha IISER, Pune.** Dr. Hotha delivered award oration entitled "*Glycochemical Synthesis and its Significance in Mycobacteriology." For* Biological Sciences the award was conferred to **Dr. Sathees C. Raghavan, IISc, Bengaluru.** Dr. Raghwan delivered award oration entitled "*An Inhibitor of Nonhomologous DNA End Joining blocks Tumor Progression in Mice, and may Reduce Dose of Radiotherapy".* The Foundation Day Celebration function ended with the vote of thanks by Mr. Vinay Tripathi.

One day Seminar on "Mass and NMR Techniques in Drug Research" 24th September- 2014

Sophisticated Analytical Instrument Facility (SAIF), CDRI has taken initiative to organize one day seminar cover organic chemistry, Natural products/herbals/ayurveda/plant metabolomics, instrumentation/ quantitative analysis, drug metabolism and pharmacokinetics applications. There is a need to increase awareness among the prospective users of the mass and NMR technique. Total 55 participants from different universities/institution attended the seminar. The invited speakers Dr. K.P. Madhusudnan, Dr. R. Srinivas IICT, Hyderabad, Dr. Raja Roy CBMRI, Lucknow and Dr. Gopal vaidyanathan Waters India are all international experts in their respective areas and delivered talks on the

current state of mass spectrometry and NMR techniques with the highlights of hot topics and potential future course of advances this area. This knowledge sharing session will definitely be beneficial for researches and may provide a new platform for them.

25th National Congress of Parasitology on "Global Challenges in the Management of Parasitic Diseases"

CSIR- Central Drug Research Institute, Lucknow and The Indian Society for Parasitology jointly organized 25th National Congress of Parasitology on **"Global Challenges in the Management of Parasitic Diseases"** from 16-18 October, 2014.Director CSIR-CDRI, Dr. S.K. Puri welcomed the guest and briefed about the three day's National Congress of Parasitology. Padma Bhushan Dr. Vinod P. Sharma, Founder Director, National Institute of Malaria Research and Additional Director General, Indian Council of Medical Research was the Chief Guest of this function. In his address he discussed the Research and Development of parasitic diseases in India. He told many parasitic diseases which have been eradicated from country due to the efforts of Parasitologists of India but many more are still need to be eradicated. He appreciated the contribution made by CDRI Scientists for developing low cost medicine to cure Malaria.

During the Inaugural program the Guest of Honour Dr. P. S. Ahuja, Director General, Council of Scientific & Industrial Research, showed his concern for making our country free from infectious and parasitic diseases. In his address to the participants he urged to the young researcher to do the targeted research for making India a parasitic disease free country. At this occasion, the President of Indian Society of Parasitology, Dr. S. L. Hoti, briefed the mandate of society and appreciated the efforts made by CDRI team for organizing this congress. The conference was attended by more than two hundred distinguished delegates from all over the country. The conference was concluded with the plenary talk of chief guest of Valedictory Session, Dr. V. M. Katoch, Secretary to Govt. of India (DHR), Ministry of Health and Family Welfare and DG, ICMR, New Delhi. In his talk he emphasized that parasitic research should be more practical rather it remain in books only. The ignorance towards occurrence of parasitic diseases cases must be avoided. After his talk, he conferred the awards for BN Singh oration award, Dr. BP Pandey memorial lecture award and Young Scientists awards for best scientific research in Parasitology, best poster awards for young researchers and Dr. MB Mirza award for best publication in Parasitology. The conference was brought to a close after a vote of thanks by the organizing secretary, Dr. JK Srivastava.

43rd National Seminar on Crystallography

Year 2014 has been declared as the 'International Year of Crystallography' by the United Nations because of the invaluable role played by the discipline in many areas of human endeavor. The 43rd National Seminar on Crystallography (NSC43c) was held under the aegis of the Indian Crystallographic Association (ICA) at the CSIR-Central Drug Research Institute, Lucknow during 12 – 14 November 2014.

Dr. Girish Sahni, Director, CSIR–Institute of Microbial Technology was the Chief Guest for the Inaugural event. Dr. Girish Sahni delivered Inaugural Address entitled 'Tweaking Mechanistic Insights from Crystallography Using

Complementary Approaches'. Prof. Tej P. Singh from All India Institute of Medical Sciences, New Delhi delivered a plenary lecture on Structure based evidence of antibiotic action of innate immunity proteins and their therapeutic applications at inauguration day. The 43rd National Seminar on Crystallography witnessed various sessions of intense deliberations on Molecular structural biology and Crystallography. About 50, eminent scientists/researcher from the premier Institutes of country delivered their talks during various sessions. Dr Ravishankar proposed the vote of thanks for contributors for successful organization of event during the valedictory function.

Clinrescon 2014

A National Symposium on clinical trials and adverse drug reaction "**Clinrescon 2014**" was inaugurated by Dr. Raj Malhotra,Acting Vice Chancellor and Dean, King George Medical University,Lucknow. Dr. Ram Vishwakarma, Director CDRI emphasized the importance of monitoring adverse drug reaction. Dr. Ashim Ghatak, Chairman, Organizing Committee, welcomed all guests and appraised the importance of this symposium. The symposium was graced with guest of honor Prof. Y. K. Gupta, Head, Department of Pharmacology,All India Institute of Medical Sciences (AIIMS), New Delhi; Dr. Nilima Kshirsagar, National Chair in Clinical Pharmacology, Indian Council of Medical Research (ICMR), Govt. of India, New Delhi and Dean ESIPGIMSR MGM Hospital, Mumbai; Ms. Annam Visala, Deputy Drug Controller General India CDSCO, New Delhi and Dr. Sarala Balachandran, Project Director, OSDD Unit, CSIR, New Delhi. Dr. Vivek Bhosale, Secretary, Organizing Committee, proposed vote of thanks and announced that the Centre for Adverse Drug Reaction Monitoring is functional at the Institute and requested all healthcare professionals and consumers to send information to CSIR-CDRI.

XXXVIII All India Cell Biology Conference & International Symposium on Cellular Response to Drugs

38Th All India Cell Biology Conference and International Symposium on "Cellular Response to Drugs" were organized from December 10-12 2014 at CSIR-Central Drug Research Institute,Lucknow. The symposium was inaugurated with the Presidential Address of Prof. B.N. Singh, President of Indian Society of Cell Biology. He gave brief introduction to Cell Biology and its development in the last decade and briefed about the chromosome studies, autoradiography and gene expression studies, its importance in the development of molecular biology. He added that isolation of macromolecules like DNA, RNA and proteins given opportunity to study the mechanisms and leads to new developments. The inaugural lecture was delivered by Prof S.C. Lakhotia, BHU, Varanasi and emphasised on understanding of cell biological basis of *Ayurveda Rasayana* ormulations using scientific basis. Ayurveda, the age old traditional health-care system in India has suffered in recent times because of absence of in-depth rigorous scientific studies on modes of actions of its practices

and formulations. For the first time, his studies suggested potential therapeutic applications of *Ayurvedic Rasayans* and *Ras-sindoors* in providing holistic relief from the increasing societal burden of neurodegenerative disorders.

The three day symposium witnessed various sessions of intense deliberations on different aspects of Cell biology. More than hundred, eminent scientists/ researcher from the premier Institutes of country delivered their talks and presented posters during various sessions. Dr. B.N. Singh and Dr. S.K. Rath proposed the vote of thanks for contributors for successful organization of event during the valedictory function.

One Day Symposium on "Drug Discovery in India: Past, Present and Future" on 90th Birth Anniversary of Padmashri Dr. Nitya Anand

CSIR-Central Drug Research Institute, Lucknow organized a One Day Symposium on "Drug Discovery in India: Past, Present and Future" on 90th Birth Anniversary of Padmashri Dr. Nitya Anand on January,1 2015. He is a legendary figure in the field of Drug Discovery & Development. On this occasion, many renowned personalities from the field of Drug Discovery and Development assembled in this symposium to honour the legend. Director CSIRCDRIDr. RA Vishwakarma welcomed Dr Nitya Anand and otherguests. In first session of symposium, Padma Bhushan Prof. G.P.Talwar discussed about the development of vaccines for fertility control. The vaccines were found therapeutic application against Prostate and Breast cancer and other type of cancers. His vaccines are developed in India and are ready to launch for human uses. Dr K. Nagrajan, Corporate Advisor, Hikel R&D Centre Bangaluru, briefed about Drug Discovery in India. He discussed some requirements for successful New Drug development and emphasized upon advancement of bio therapeutics in India. Dr. B.N. Dhawan, Ex-Director, CSIR-CDRI, chaired this session.

In the second session, more than 50 research scholars presented their research work in poster form related to recent advances in Drug Discovery. In third session, Dr. V.P. Kamboj, Ex-Director, CSIR-CDRI chaired the session and Dr A.V. Ramarao, Chairman & Managing Director, Avra Laboratories Pvt. Ltd.,Hyderabad delivered a talk on Drug Discovery In India: Past Present and Future and shared his experiences of commercialization, R&D activities in his own venture named Avra. He also discussed his reminiscences with Dr. Nitya Anand. Many other colleagues and students of Dr. Nitya Anand shared their reminiscences on this occasion. Dr. Nitya Anand shared his vast experiences since hid joining to this institute. Dr. R.A. Vishwakarma, Director, CSIR-CDRI,felicitated Dr. Nitya Anand at the closing of Symposium.

Programme on Preventive Vigilance in Works and Services

CSIR-CDRI In collaboration with CSIR-HRDC, Ghaziabad organized a two days programme on Preventive Vigilance in Works and Services on February 05-06, 2015. Participants from all four Lucknow based CSIR laboratories participated in this programme.

64th Annual Day of CSIR- Central Drug Research Institute and 40th Sir Edward Mellanby Memorial Oration

CSIR-CDRI celebrated its 64th Annual Day on the 17th February, 2015. The Annual day's main programme was organized in afternoon with the graceful presence of Prof. Gautam R. Desiraju, as the Chief Guest and Dr. B.N. Dhawan, Former Director, CSIR-CDRI president of function. Dr. Ram A. Vishwakarma, Director CSIR-CDRI formally welcomed the Chief Guest, other dignitaries and presented a detailed account of the achievements made by CSIR-CDRI during the reporting period. The event started off with the 40th Sir Edward Mellanby Memorial Oration by Prof. Gautam R. Desiraju, Indian Institute of Science, Bengaluru in the memory of Institute's Founder Director Sir Edward Mellanby. The topic of the oration was "Crystal Engineering: Enhancement of Pharmaceutical Physicochemical properties". In his oration, Prof. Desiraju expressed his concern about the reasons of failure in the developmental phase of drugs and possibilities of taking to the next stage with subtle improvements saving time and money. He also emphasized the importance of Crystal Engineering vis-à-vis drug development program with special reference to techniques relevant to polymorphs, co crystal and salts.

Later, the Annual Report, 2014-15 was released by the distinguished guests on the dais, followed by distribution of Annual Awards for the best performing employees and students. On this occasion the prestigious CDRI Awards-2015 for Excellence in Drug Research was also announced. In Life Sciences category CDRI Award-2015 has been awarded to Prof. Rinti Banerjee, IIT Bombay for her work on "Trigger Responsive Nanoparticles for Drug Delivery". In the Chemical Sciences category, the award has gone to Dr. Ramakoteswara Rao Jetti, Mylan Laboratories, Medak, Telangana for his work on "Novel Solid Forms of Active Pharmaceutical Ingredients". Dr. MM Dhar Memorial Distinguished Career Achievement Award-2014 for Chemical Sciences was awarded to Dr. Veenu Bala and for Biological Sciences to Dr. Avinash Kumar. Dr. JM Khanna Memorial Distinguished Career Achievement Award-2014 for Pre-clinical & Clinical Sciences was awarded to Dr. Yashpal Singh Chhonker. Dr. JM Khanna Memorial Early Career Achievement Award 2014 was awarded to Mr Vivek Kumar Pawar and Dr. Swarn Nitya Anand Memorial Early Career Achievement Award 2014 for Women Research Scholars was awarded to Ms. Samriddhi Shukla. Further, Excellence awards to the publications with impact factor greater than 10 in category I and greater than 6 in category II, patents that were granted abroad and best technology award were also awarded. Furthermore, the institute felicitated its employees completing 25 years of service. Dr. B.N Dhawan, in his presidential remarks praised the efforts made by the institute. He was delighted with the performance of the younger scientists to carry on tone and rhythm of the able leadership from its former directors and stalwarts, as this institute is modernized beyond imaginations and everyone has greater expectations from the future research. Mr Vinay Tripathi proposed vote of thanks and concluded the programme.

21st ISCB International Conference (ISCBC-2015) on Current Trends in Drug Discovery and Developments

Central Drug Research Institute, Lucknow & Indian Society of Chemists & Biologists, Lucknow, India jointly organized, 21st ISCB International Conference from February, 25-28, 2015. The conference was inaugurated with welcome address by Director, CSIR-CDRI Dr. Ram Vishwakarma and presidential address by Prof. Anamik Shah, President of ISCB. About 40 invited speakers from all around the country delivered their lectures during 12 sessions of the conference. More than two hundred participants attended the conference. ISCB Award for Excellence and ISCB Young Scientist Awards was also conferred. Organising Secretary, Dr. P.M.S. Chauhan, proposed the vote of thanks for all the participants and organising teams along with media persons for grand success of the event.

National Symposium on "Animals in Research and Testing: A Cross-Talk between Relevance and Ethics" (NSART 2015)

CSIR-CDRI In collaboration with Laboratory Animal Science Association of India (LASAI) organized a National Symposium on "Animals in Research and Testing: A Cross-Talk between Relevance and Ethics" (NSART 2015) from March 13-14, 2015, which was inaugurated by Dr. R.K. Singh, Director, IVRI, Izatnagar as Chief Guest. In his inaugural speech Dr. Singh emphasized on ensure of Animal Welfare during the course of research and experimentation on them. Prof. B.N. Dhawan, Former Director, CSIR-CDRI, Lucknow graced the function as Guest of Honour. He briefed the uses of Animals in biomedical research that is very minimal (app 8%) but without which it is impossible to develop any new therapeutic agent meant for mankind. He also mentioned that unless until we ensure the welfare and Humane use of these research animals one cannot produce valid and reliable experimental outcomes. Dr. Shailja Bhattacharya, Chairperson, NSART 2015, presided over the function and welcomed all guests, delegated and dignitaries attending the same. Dr. Rishendra Verma, President, LASAI, put the special remarks on the current scenario of Laboratory Animal Science in our Country. In his speech he raised the issue about control and governing of animal research and experimentation by Ministry of Environments & Forests, while it seems that they are no way related to this area and recommended to bring it under suitable agency. Dr DS Upadhyay Organizing Secretary, NSART 2015 introduced about the significance and genesis of this symposium. Around 150 participants and more than 25 invited eminent speakers will deliver their talks during different scientific session related to Science, Welfare and Ethics.

One Day Workshop on Patinformatics

CSIR-CDRI In collaboration with CSIR-URDIP, Pune organized a One Day Workshop on Patinformatics on March 19, 2015. Director Dr. R. Vishwakarma welcomed the participants and emphasized on the need of Patinformatics in current R&D scenario. Participants from all four Lucknow based CSIR laboratories participated in this workshop. Dr. Raj Hirwani, Head CSIR-URDIP, Pune delivered a talk on, Patinformatics: Basics and Applications. Participants learned about Reading a patent /Patent Classifications, Patent Database searching along with various Case Studies on Patent Landscape Analysis, Freedom to operate Analysis and Patentability Study during the workshop.

Distinguish Visitor

Distinguish Visitor

Mr. Jorge Cardenas Robles
Ambassador of Bolivia
Visited Institute to explore the opportunities for bilateral research collaborations between Bolivia and India on 31.10.2014

Student delegation's visit under 'Outreach Programme'

Sl No.	Students Delegations	No. of Members	Date
1.	Delhi Public School, Jankipuram Lucknow	30	26.09.2014
2.	Kendriya Vidyalaya, Bakshi ka Talab Lucknow	30	26.09.2014
3.	Central Academy, Lucknow	30	26.09.2014
4.	Allahabad University, Allahabad	35	26.09.2014
5.	Lucknow University, Lucknow	20	26.09.2014
6.	Saraswati Dental College, Lucknow	50	26.09.2014
7.	Department of Botany, Gauhati University, Assam	39	05.11.2014
8.	Saaii College of Medical Science & Technology, Kanpur	15	07.11.2014
9.	Air Force School Bamrauli, Allahabad	15	26.11.2014
10.	St. John's College, Agra	48	19.02.2015

Deputations Abroad

Name of Scientist	Country of Visit	Purpose of Visit	Period of Deputation
Dr. Prem Man Singh Chauhan	Germany	For discussion on joint DST-DFG Research Project	24 November to 3 December 2014
Dr. Amit Mishra	Norway	To attend the meeting and preparing a collaborative grant application	6 to 9 January 2015
Dr. Kumaravelu Jagavelu	UK	To attend seminar on Novel Therapeutics in Vascular Disorder	10 to 12 December 2014
Dr. Sripathi R. Kulkarni	USA	Invited as visiting Professor in the Centre of Law, Technology and Arts	January 2014 to January 2015
Dr. Sarika	USA	For advance research at South-West Medical Center Texas University	30 October 2013 to 29 October 2014
Dr. Jiaur Rahaman Gayen	Germany	Invited to conduct his research project with Prof. Dr. Michael Roden, Director German Diabetes Centre	01 November 2014 to 30 April 2015

STAFF NEWS

(October 2014- March 2015)

Promotion

- **Mr. H.K. Khulve,** PS to AO

Promotion Posting

- **Mr. Praphull Kumar** SO (S&P) to SPO CSIR-CDRI to CSIR-IIIM Jammu
- **Mr. Prasenjeet Mitra,** SO (S&P) to SPO CSIR-CDRI to CSIR-IIP, Dehradun

External Transfer

- **Mr. Bijoy Kumar Kar,** COA, CSIR-CMERI, Durgapur to CSIR-CDRI, Lucknow
- **Mr. Ravi Shankar Choudhary,** SPO (S&P) CSIR-CIMFR Dhanbad to CSIR-CDRI, Lucknow
- **Mr. Sandeep Kumar Talathoti,** CSIR-CDRI to CSIR-IICT, Hyderabad
- **Mr. Ram Rishi Raman,** Section Officer (F&A) CSIR-CDRI to CSIR-CBRI, Roorkee
- **Mr. Sunil Kumar,** Section Officer (Gen) CSIR-CDRI to CSIR-CCMB, Hyderabad
- **Mr. Biranchi Sarang,** Section Officer (Gen) CSIR-CDRI to CSIR-IIP, Dehradun
- **Mr. Madhuranjan Pandey,** Section Officer (Gen) CSIR-CDRI to CSIR-IIP, Dehradun

Internal Transfer

- **Mrs. Savita Tripathi,** Technical Officer (3) Botany Division to S&T Management Unit

Superannuation

- **Mrs. Noor Jehan,** Lab Asstt., Bio Chemistry (31.10.2014)
- **Mr. SPS Bhandari,** Senior Technical Officer, MPC Division (31.10.14)
- **Mr. Radhey Shyam,** Senior Technician (2) Laboratory Engineering Services (31.10.2014)
- **Mr. G.M. Dayal,** Private Secretary, General Aministration (31.10.2014)
- **Mr. H. K. Khulve,** Administrative Officer (31.10.2014)
- **Dr. S. K. Puri,** Acting Director, Cheif Scientist, Parasitology Division (30.11.2014)
- **Dr. Ram Pratap,** Cheif Scientist, MPC Division (30.11.2014)
- **Mr. Ghanshyam,** Lab Asstt. Hindi Section (30.11.2014)
- **Dr. Neeraj Sinha,** Sr. Principal Scientist, Toxicology Division (31.12.2014)
- **Mr. J.A. Zaidi,** Principal Technical Officer, Computer Centre (31.12.2014)
- **Dr. C. Nath,** Chief Scientist Toxicology Division (31.01.2015)
- **Mr. Ram Swath Prasad Rai,** Gr.D. (31.01.2015)
- **Mr. Tej Singh,** Asstt. (G) Grade I Estt II (28.02.2015)
- **Mr. Kishan Singh,** Sr. Technician (2) (31.03.2015)
- **Mr. Devi Dutt,** Lab Asstt. Biochemistry (31.03.2015)

Resignation

- **Mrs. Pooja Taneja**, Jr. Steno, Pharmaceutics Division

OBITUARY

Mr. Sachin, Group 'D' Bill Section, 6.12.2014

CDRI Family conveys heartfelt condolences to the bereaved family

Editorial Board : Chairman: Dr. Madhu Dikshit; **Editor-in-Chief:** Mr. Vinay Tripathi; **Executive Editors:** Dr. Sanjeev Yadav and Dr. Anand P. Kulkarni; **Hindi Translation:** Mrs. Neelam Srivastava; **Technical Support:** Mr. Ravindra Londhe, Mrs. Savita Tripathi, Mr. M. Muruganantham, Mr. Jitendra Patel

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