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CSIR - CDRI Newsletter

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CSIR-Central Drug Research Institute
www.cdriindia.org

From the Director's Desk

I am glad to present the current issue of CSIR-CDRI Newsletter on the occasion of 73rd Foundation Day of Council of Scientific and Industrial Research (CSIR). Nevertheless, the occasion again brings us an opportunity to look back in the history of our institute and recall a long list of its distinct achievements and performances in the service of nation. The Institute has successfully metamorphosed the Indian Pharma Industry during post independence era by providing the much required economical process technologies for pharmaceutical products and contributed significantly towards making the modern healthcare affordable for all in India and also in other developing countries. The human resource developed at the Institute has played a valuable role for the Indian Pharma industry. Repertoire of achievements of CDRI in terms of development of new drugs and process technologies, new knowledge base, intellectual value and human resource always makes me feel proud. On this occasion, I once again acknowledge the outstanding leadership provided by my predecessors in making of this premier drug research Institute in India. Rich in experience and capabilities to undertake biomedical research and delivering the requisite output at par with the international standards have always been our strength.

Dr. Harsh Vardhan, Union Minister for Science &Technology, visited CSIR-CDRI, Lucknow in April 2015 and said, "I am confident that the drug laboratories under CSIR are capable of backing up the Swasth Bharat Mission. Our scientists are focusing on both infectious and life-style related diseases. We are developing next generation drugs, biologics, biosimilars, gene therapeutics, stem cell therapeutics, personalized medicine and multi-functional nanomedicine." He also announced that Government would soon set up a Biopharma Industry Incubator (BII) under the umbrella of CSIR-CDRI, Lucknow which would strive to build a new generation of enterprises in the health care sector.

As in the past, we continue to attract industry partners in joining us for further collaborative development of our research output. I am glad to announce that in April 2015 CSIR-CDRI has signed a licensing agreement of Plant Extract A-4744, useful for Osteoprotective and Bone anabolic effects, with Pharmenza Herbal Pvt. Ltd. Gujarat. I feel pride in the fact that our institute is making strident progress towards fulfilling its mandate.

Continuing the legacy, we performed well in all aspects during the reporting period of the current issue of Newsletter. We received "Outstanding Translational Research Institute Award" by South Asian Chapter of American College of Clinical Pharmacology (SAC-ACCP) and Dr. Atul Goel received DAE-SRC Outstanding Investigator's Award (2014-15). For the year 2015, so far, we have published more than 268 research papers with average IF : 3.47. The number of publications with IF>5 is 37. I hope we will cross the previous records in terms of both the quality and number of research publications. Apart from this, Institute performed well in generating intellectual property rights and voluminous data towards several new leads/hits in the area of Malaria, Osteoporosis, Diabetes & Dyslipidemia, Cancer, Thrombosis and Tuberculosis.

Lastly, I convey 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.

With best wishes

M. Dikshit

(Madhu Dikshit)

A Newsletter from

CSIR-CENTRAL DRUG RESEARCH INSTITUTE
COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
Sector 10, Jankipuram Extension, Sitapur Road, Lucknow-226 031
Phone: 91 522 - 2772450, 2772550 (PABX)
Fax : 91 522 2771941, Website: www.cdriindia.org

CONTRIBUTIONS TO DRUG DEVELOPMENT

Candidate Drugs under Advance Stages of Development

Diseases / Disorders	Candidate Drugs	Clinical Status	Licensees & Collaborators
Malaria	**97-78** Antimalarial	The Phase-I Clinical Trial Multiple dose studies at PGIMER, Chandigarh to be initiated. It is proposed to undertake Efficacy establishment in Arteether Resistant Animal Model in collaboration with MMV	IPCA Labs., Mumbai
Diabetes & Dyslipidemia	**CDR134D123** Antihyperglycemic	Awaiting clearance from DGCCRAS New Expert committee for inclusion of the plant in the Extra Ayurvedic Pharmacopia to avail marketing permission in herbal mode. The demonstration of methodology to TVC on processing of fresh fruit collections is going on	TVC Sky Shop Ltd., Mumbai
	CDR134F194 Antihyperglycemic	Phase-I Single Dose and Multiple Dose Clinical trial. The trials are likely to commence soon	
Osteoporosis	**99-373** Anti-osteoporotic	Phase I Clinical trials to be initiated	Open for licensing
	CDR4744F004 (Osteoprotective herbal product)	Licensed to Pharmanza Pvt. Ltd., Gujarat on April 23, 2015. Clinical trial has been registered on June 03, 2015 (registration number CTRI/2015/06/005850) Clinical trial on accelerated fracture healing by Dalzbone started from July 2015 at Karandikar Hospital and Research Center, Nasik, Maharashtra	Pharmanza Pvt. Ltd., Gujarat

Potential New Leads

Diseases / Disorders	Lead & Efficacy	Current Status	Licensees & Collaborators
Osteoporosis	**CDR914K058** Osteogenic	One synthetic lead (KM-B011) having rapid fracture healing effect being jointly developed with Kemxtree under DBT-BIRAC funding	Kemxtree, USA
	S007-1500 Rapid fracture healing	*In vitro* chromosomal aberration assay using human peripheral lymphocytes did not exhibit any adverse effect. Dose range finding studies are in progress Essential Safety Pharmacological Studies have been completed	Open for licensing

Malaria	**S011-1793** Antimalarial	Analytical and bioanalytical methods developed. The compound found to be more than 97% stable in both acidic (SGF) and basic (SIF) conditions and plasma up to 2 hr.The oral bioavailabilities (%F) triphosphate salt was 64%. Essential safety pharmacological study are under way	Open for licensing
Cancer	**S007-1235** Anticancer	LC-MS/MS method for quantitative estimation was developed and applied for the *in vitro* and *in vivo* pharmacokinetic studies. With human liver microsomes, it showed higher *in vitro* half-life, lower intrinsic and hepatic clearance. It showed low systemic availability (AUC, 2926.3 ng h/mL), large volume of distribution (41.2 L/kg) and high clearance (3.4 L/h/kg) after 10 mg/kg intravenous administration in female Balb/c mice	Open for licensing
Thrombosis	**S007-867** Antithrombotic	Metabolized by CYP3A4 and CYP 2C19. It exhibits around 24% nonspecific binding to the microsomes. The blood to plasma ratio was between 0.8-1.2 indicating that there is no significant partitioning into any of the compartment	Under negotiation
	S002-333 Antithrombotic	Ames Assay completed. Compound is non mutagenic. *In vitro* chromosomal aberration assay using human peripheral lymphocytes is ongoing. The pharmacokinetic (PK) studies in male NZW rabbits showed that The absolute oral bioavailability was 16.32% whereas; it was 8% for both R- and S-enantiomer. S002-333 demonstrates low clearance and high tissue distribution characteristics with R-enantiomer having higher bioavailability than S-enantiomer.	
Diabetes & Dyslipidemia	**CDR267F018** Antidyslipidemic	Marker compound isolation for stability & PK studies are in progress	Open for licensing

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

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CONTRIBUTIONS TO SCIENCE & TECHNOLOGY

1. **Metal-Free Decarboxylative cyclization/ring expansion: Construction of Five-, Six-, and Seven-membered heterocycles from 2-Alkynyl Benzaldehydes and cyclic amino acids**, (Samala S, Singh G, Kumar R, Ampapathi RS, Kundu B., ***Angew Chem Int Ed***, 54(3), 9564-9567**, IF: 11.261)**

   A one pot synthesis of 1*H*-benzo[g]indoles, tetrahydrobenzo[h]quinolines, and naphtho[1,2-b]azepines from 2-alkynyl benzaldehydes and cyclic amino acids is reported. The salient feature of the strategy involves formation of three new bonds (one CN and two CC bonds) by a metal-free decarboxylation/cyclization/one-carbon ring expansion sequence in one pot.

2. **Synthesis of 3,4,5-trisubstituted Isoxazoles from Morita-Baylis-Hillman acetates by an $NaNO_2/I_2$-mediated Domino reaction**,(Dighe SU, Mukhopadhyay S, Kolle S, Kanojiya S, Batra S, ***Angew Chem Int Ed***, 54(37), 10926-10930, **IF:11.261)**

   An efficient $NaNO_2/I_2$-mediated one-pot transformation of Morita–Baylis–Hillman (MBH) acetates into alkyl 3-nitro-5-(aryl/alkyl)isoxazole-4-carboxylates is described. In a cascade event, initial Michael addition of $NaNO_2$ to the MBH acetate furnishes the allylnitro intermediate which undergoes I_2-catalyzed oxidative α-C-H nitration of the nitromethyl subunit followed by [3+2] cycloaddition to afford the title compounds. Structural elaborations of these highly substituted isoxazoles by S_NAr reactions and hydrogenolysis allows access to useful products

3. **Molecular iodine catalysed one-pot synthesis of chromeno[4,3-b]quinolin-6-ones under microwave irradiation,** (Koneni V., Sashidhara, Gopala Reddy Palnati, L Ravithej Singh, Amit Upadhyaya, Srinivasa Rao Avula, Abdhesh Kumar and Ruchir Kant, ***Green Chemistry*****, 17**, 3766 – 3770, **IF: 8.02)**

   We demonstrate a facile one pot approach for the regioselective synthesis of chromeno[4,3-b] quinoline derivatives in excellent yields under microwave (MW) irradiation. This transformation presumably proceeds via a three-component tandem annulation of 4-hydroxycoumarin with aromatic aldehydes and aromatic anilines, involving a Hofmann-Martius type rearrangement.

4. **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, Chattopadhyay N., ***J Bone Miner Res*****.,** doi: 10.1002/jbmr2520., **IF: 6.832**)

   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 anti-resorptive, 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 OVX and following induction of bone loss were given a steady-state exposure of ODN (9µM/day) for 14 weeks. Sham operated and OVX rabbits treated with alendronate (ALD), 17β-estradiol (E2) or PTH served as various controls. Efficacy was evaluated by assessing BMD, bone microarchitecture (using microcomputed 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 and geometric indices, vertebral

compressive strength, trabecular lining cells, cortical parameters (femoral BMD, area and thickness, and periosteal deposition) and serum P1NP were largely comparable. Skeletal improvements in ALD 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 crytallinity 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, we show that ODN reverses BMD, skeletal architecture and compressive strength in osteopenic rabbits however, increases crystallinity and tissue mineralization thus leading to increased cortical bone brittleness.

5. **An unprecedented alteration in mode of action of IsCT resulting its translocation into bacterial cytoplasm and inhibition of macromolecular syntheses,** (Tripathi Jitendra K., Kathuria Manoj, Kumar Amit, Mitra Kalyan, Ghosh Jimut K., ***Scientific Reports*****, 5, 9127, IF:5.578)**

IsCT, a 13-residue, non-cell-selective antimicrobial peptide is comprised of mostly hydrophobic residues and lesser cationic residues. Assuming that placement of an additional positive charge in the non-polar face of IsCT could reduce its hydrophobic interaction, resulting in its reduction of cytotoxicity, an analog, I9K-IsCT was designed. Two more analogs, namely, E7K-IsCT and E7K,I9K-IsCT, were designed to investigate the impact of positive charges in the polar face as well as polar and non-polar faces at a time. These amino acid substitutions resulted in a significant enhancement of therapeutic potential of IsCT. IsCT and E7K-IsCT seem to target bacterial membrane for their anti-bacterial activity. However, I9K-IsCT and E7K, I9K-IsCT inhibited nucleic acid and protein syntheses in tested *E. coli* without perturbing its membrane. This was further supported by the observation that NBD-IsCT localized onto bacterial membrane while NBD-labeled I9K-IsCT and E7K, I9K-IsCT translocated into bacterial cytoplasm. Interestingly, IsCT and E7K-IsCT were significantly helical while I9K-IsCT and E7K, I9K-IsCT were mostly unstructured with no helix content in presence of mammalian and bacterial membrane-mimetic lipid vesicles. Altogether, the results identify two novel cell-selective analogs of IsCT with new prototype amino acid sequences that can translocate into bacterial cytoplasm without any helical structure and inhibit macromolecular syntheses.

6. **Isolation, characterization and antifungal docking studies of wortmannin isolated from *Penicillium radicum*,** (Singh Vineeta, Praveen Vandana, Tripathi Divya, Haque Shafiul, Somvansh Pallavi , Katti S B and Tripathi C K M, **Scientific Reports,** 5, 11948, **IF: 5.578)**

During the search for a potent antifungal drug, a cell-permeable metabolite was isolated from a soil isolate taxonomically identified as *Penicillium radicum.* The strain was found to be a potent antifungal agent. Production conditions of the active compound were optimized and the active compound was isolated, purified, characterized and identified as a phosphoinositide 3-kinase (PI3K) inhibitor, commonly known as wortmannin (Wtmn). This is very first time we are reporting the production of Wtmn from *P. radicum.* In addition to its previously discovered anticancer properties, the broad spectrum antifungal property of Wtmn was re-confirmed using various fungal strains. Virtual screening was performed through molecular docking studies against potential antifungal targets, and it was found that Wtmn was predicted to impede the actions of these targets more efficiently than known antifungal compounds such as voriconazole and nikkomycin i.e. 1) mevalonate-5-diphosphate decarboxylase (1FI4), responsible for sterol/isoprenoid biosynthesis; 2) exocyst complex component SEC3 (3A58) where Rho- and phosphoinositide-dependent localization is present and 3) Kre2p/Mnt1p a Golgi alpha1,2-mannosyltransferase (1S4N) involved in the biosynthesis of yeast cell wall glycoproteins. We conclude that Wtmn produced from *P. radicum* is a promising lead compound which could be potentially used as an efficient antifungal drug in the near future after appropriate structural modification to reduce toxicity and improve stability.

BUSINESS DEVELOPMENT ACTIVITIES

Major new Contracts/Agreements Signed/Undertaken:

Details	Client/Collaborator	Signing Date
License Agreements		
CSIR-CDRI Plant Extract A-4744	Pharmanza Herbal Pvt. Ltd., Gujrat	10.04.2015
Sponsored Project Agreements		
Synthetic Microbicidal Vaginal Spermicides: Design, Synthesis and Biological Evaluation	HLL Lifecare Limited Thiruvananthpuram	13.05.2015
In vitro studies of 10 leads of NIF for anti-malarial evaluation	NationalInnovation Foundation-India (NIF), Ahmedabad, Gujarat	04.06.2015
In vivo studies of 6 leads of NIF for anti-malarial evaluation	NationalInnovation Foundation-India (NIF), Ahmedabad, Gujarat	04.06.2015
Memorandum of Understandings signed for joint R&D		
Habitat ecology and species diversity of Cordyceps in district Pithoragarh, Central Himalaya	Department of Zoology, LSM Government Postgraduate College, Pithoragarh	21.04.2015
Immunological characterization of recombinant culture filtrate proteins from ESAT-6 family of *Mycobacterium tuberculosis* H37Rv	King George Medical University, Lucknow	01.05.2015
Research & Co-development Agreement on MTB Diagnostic Kit	Nextec Lifesciences Pvt. Ltd., Gomti Nagar, Lucknow	28.05.2015
Memorandum of Agreements		
Tissue specific transcripts and cardical glycoside profiling of calotropis plant after different biotic and abiotic elicitor treatment	DBT, New Delhi	30.04.2015
Identification and functional characterization of novel microRNA candidates altered by phytoestrogen medicarpin: Role in the pathogenesis of osteoporosis	DBT, New Delhi	06.07.2015
Secrecy Agreements		
Engaging CSIR-CDRI for scientific advice on a project related to bone health disorders including osteoporosis, covering the pathology, animal models, clinical and preclinical end points, translational aspects and treatments	Glenmark Pharmaceuticals Limited, Mumbai	02.07.2015

Licensing of CSIR-CDRI Plant Extract A-4744

Osteoprotective and Bone anabolic effects in adult Sprague Dawley rats with bilateral ovariectomy (OVx) CSIR-CDRI signed the licensing agreement with Pharmenza Herbal Pvt. Ltd. Gujarat in April, 2015.

Technology Licensing

Technology Demonstration

Clinical trial registration in June, 2015 (registration number CTRI/2015/06/005850) Clinical trial on accelerated fracture healing started in July, 2015 at Karandikar Hospital and Research Center, Nasik Maharashtra.

New Projects Undertaken

Grant-in-Aid Projects

1. Skeletal effect of stimulation of receptor activator of NF-Kb ligand(RANKL) from osteoblast by the ophylline and the mechanism of action of the drug

The major objectives of this DST funded project are to study the skeletal effect of stimulation of receptor activator of NF-Kb ligand (RANKL) from osteoblast by the ophylline and to understand the mechanism of action of the drug.

PI: Dr N. Chattopadhyay

Funding Agency: DST

Date of Start: 03.06.2015

Expected Date of Completion: 02.06.2018

2. Synthesis and bioevaluation of chemical libraries of β-carboline based mimics of marine natural products

This project concerns with design and synthesis of chemical libraries of β-carboline-and tetrahydro-β-carboline-based mimics of marine natural products either of plant or animal origin. These natural products include Fascaplysin, Hyrtiocarboline and Eudistomidin-B. Notably these natural compounds are reported to display potent anticancer property both in vitro and in vivo assays but are not in clinical use due to higher toxicity which possibly owes its origin to the planarity of the structures. During the project it is proposed to carry out the synthesis of chemical libraries mimicking these natural compounds and evaluating them for anticancer and anti-infective activities. In another objective of the project it is envisaged to prepare chemical libraries of fused β-carbolines using 1- or/& 3-formyl- β-carboline(s) as the building blocks. These compounds would be assessed for their biological different bioassays available in the institute

PI: Dr Sanjay Batra

Funding Agency: MOES

Date of Start: 20.04.2015

Expected Date of Completion: 19.04.2018

3. Development of sugar amino acid derived peptides self assembling selectively on bacterial membranes, forming ion pores and killing bacteria including MTB

We aim to develop cyclic as well as linear gramicidin analogs mimicking some of their residues using appropriately functionalized sugar amino acids (SAAs). These molecules will be screened for their antimicrobial, especially anti-TB activities. We also aim to study the molecular structures of these analogues by various spectroscopic methods in lipid environments by mimicking the plasma membranes of both bacterial cell wall and erythrocytes with suitable components of lipids to understand their differential modes of actions. Such studies are expected to unravel the relatively underexplored molecular mode of action of these classes of molecules in lipid environment.

PI: Dr RS Ampapathi

Co PI: Dr V. Chaturvedhi

Funding Agency: DST

Date of Start: 20.05.2015

Expected Date of Completion: 19.05.2018

4. Profiling and characterization of early phase differential-mi-RNA(s) responsible for downstream development of insulin resistance in Hmsc derived-adipocytes

We intended to develop insulin resistance model using human adipocyte cells. Towards this, we develop human mesenchymal stem cell (hMSC) derived adipocyte by following set literature protocols. We further expose these hMSC derived adipocyte to patho-physiological high concentrations of glucose and insulin which then lead to development of insulin resistance after 72 hours. In this project we aim to identify novel mi-RNA those might be participating in the development of insulin resistance by modulation of insulin signalling pathways. We aim to evaluate whether these miRNA can be used as potential biomarker and if we can modulate the expression level of these miRNA in order to revert/inhibit insulin resistance development.

PI: Dr A.N. Gaikwad

Funding Agency: DBT

Date of Start: 28.04.2015

Expected Date of Completion: 27.04.2018

5. Synthesis of Fascaplysin analogues as possible anticancer agents

Marine organisms are reservoirs of valuable compounds of bioactivities and pharmaceutical importance. Alkaloids are one of the classes of compounds from marine sources which have been attracting medicinal chemists to search for possible drug candidates for various diseases, with an emphasis on cancer. The marine alkaloid fascaplysin, which was isolated initially from the sponge inhibits the growth of S180 cell-implanted tumors and has anti-angiogenesis properties. The mechanisms of its action include the selective inhibition of cyclin-dependent kinase 4 (CDK4) (with an IC50 = 0.55 µM), which regulates the G0–G1/S checkpoint of the cell cycle, the intercalation of DNA, and the induction of apoptosis. The project is intended to thoroughly search the chemical space around this natural product for the newer molecules with better activity and with lower toxicity.

PI: Dr M.S. Reddy

Funding Agency: MoES

Date of Start: 20.04.2015

Expected Date of Completion: 19.04.2018

6. Tissue specific transcripts and cardical glycoside profiling of calotropis plant after different biotic and abiotic elicitor

The project aims to elucidate the biosynthesis pathway of CG production and its accumulation using integrated transcript and metabolite approach along with the preliminary functional analysis of selected genes involve in the pathway. This information will be utilized either to enhance the production of CGs within the plants or engineer yeast/ cell culture for heterologous biosynthesis of this pharmaceutically important CGs.

PI: Dr Vineeta Tripathi

Co PI: Dr DK Mishra &
Dr Sanjeev Kanojiya

Funding Agency: DBT

Date of Start: 20.04.2015

Expected Date of Completion: 19.04.2018

7. RNAi mediated functional analysis of biomarkers for endometrial receptivity

This project aims to full-fill the gap of our understandings for the role of miRNAs involved in endometrial receptivity using RNA interference (RNAi) technology. Hence the objectives of this study intend to elucidate the function of miRNAs involved in early pregnancy in mice. In addition, in order to establish a potential biomarker for implantation, functional characterization and analysis of miRNAs is also a major commitment of the project. In future this knowledge could be further explored to develop new modalities to treat failure and loss in pregnancy.

PI: Dr Rohit Kumar

(Young Scientist, SERB-DST)

Funding Agency: DST

Date of Start: 06.04.2015

Expected Date of Completion: 05.04.2018

Industry Sponsored Projects

1. Synthetic microbicidal vaginal spermicides: Design, synthesis and biological evaluation

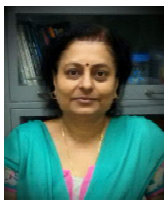
There is a lot of emphasis on female sterilization in India with little stress on other forms of contraception. Microbicidal spermicides can offer a convenient contraceptive choice for women who would like to use a reversible, self-administered contraceptive to prevent unintended pregnancies, space child-births and avoid the risk of common STDs like Trichomoniasis (which increases susceptibility to viral STDs and HIV). Over the past few decades CSIR-CDRI has been working closely with the public sector organization M/s HLL Lifecare Limited., the largest manufacturer of contraceptives in India. The R&D wing of HLL Lifecare has recently started synthesizing some new compounds for spermicidal and microbicidal activities and has entered into an agreement with CDRI for the bioassays of their new molecules, since the latter has a big experience in conducting such bioassays.

PI: Dr Gopal Gupta

Funding Agency: HLL,
Thiruvananthapuram

2. *In vitro* studies of 10 leads of NIF for anti-malarial evaluation

CSIR-CDRI has been working closely with the public sector organization since long back, M/s National Innovation Foundation-India (NIF), Ahmadabad, Gujarat has recently synthesized some new compounds for antimalarial activity and has entered into an agreement with CDRI for the biological evaluation of their 10 new leads, since the Institute has experience and expertise in conducting such bioassays for development of new antimalarials



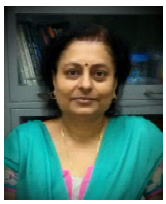
PI: Dr Renu Tripathi

Funding Agency: National Innovation Foundation-India (NIF),

Ahmadabad, Gujarat

3. *In vivo* studies of 6 leads of NIF for anti-malarial evaluation

CSIR-CDRI has been working closely with the public sector organization since long back, M/s National Innovation Foundation-India (NIF), Ahmadabad, Gujarat has recently synthesized some new compounds for antimalarial activity and has entered into an agreement with CDRI for the biological evaluation of their 06 new leads, since the Institute has experience and expertise in conducting such bioassays for development of new antimalarials



PI: Dr Renu Tripathi

Funding Agency: National Innovation Foundation-India (NIF),

Ahmadabad, Gujarat

New Facilities Established

Orbitrap mass spectrometer equipped with an electrospray ionization source (ESI) Mass range: up to 4000 Da for singly charged moleculesResolution: up to 100,000 at 400 Da

Intravital Imaging Facility Olympus BX61-FV1200-MPE (Funded by CSIR-THUNDER Project and MOES)

Some Important Publications

Chemical Sciences

Authors	Title	Journal, Vol., Issue, Page No.	IF-2014
Samala S, Singh G, Kumar R, Ampapathi RS, Kundu B.	Metal-Free Decarboxylative Cyclization/Ring Expansion: Construction of Five-, Six-, and Seven-Membered Heterocycles from 2-Alkynyl Benzaldehydes and Cyclic Amino Acids.	**Angew Chem Int Ed,** 54(33), 9564-9567	11.261
Dighe SU, Mukhopadhyay S, Kolle S, Kanojiya S, Batra S.	Synthesis of 3,4,5-Trisubstituted Isoxazoles from Morita-Baylis-Hillman Acetates by an NaNO(2) /I(2) -Mediated Domino Reaction.	**Angew Chem Int Ed,** 54(37), 10926-10930	11.261
Koneni V., Sashidhara, Gopala Reddy Palnati, L Ravithej Singh, Amit Upadhyaya, Srinivasa Rao Avula, Abdhesh Kumar and Ruchir Kant	Molecular iodine catalysed one-pot synthesis of chromeno[4,3-b]quinolin-6-ones under microwave irradiation	**Green Chemistry, 17,** 3766 - 3770	8.020
Kumar, Yalla Kiran; Kumar, Gadi Ranjith; Reddy, Thota Jagadeshwar; Sridhar, Balasubramanian; Reddy, Maddi Sridhar	Synthesis of 3-Sulfonylamino Quinolines from 1-(2-Aminophenyl) Propargyl Alcohols through a Ag(I)-Catalyzed Hydroamination, (2+3) Cycloaddition, and an Unusual Strain-Driven Ring Expansion	**Organic Letters,** 17, 9, 2226-2229	6.364
Naresh G, Kant R, Narender T.	Silver(I)-Catalyzed Regioselective Construction of Highly Substituted α-Naphthols and Its Application toward Expeditious Synthesis of Lignan Natural Products.	**Organic Letters,** 17, 14, 3446-3449	6.364
Kumar R, Arigela RK, Kundu B.	Unprecedented Transformation of a Directing Group Generated *In Situ* and Its Application in the One-Pot Synthesis of 2-Alkenyl Benzonitriles.	**Chemistry - A European Journal,** 21, 33, 11807-11812	5.731

Biological Sciences

Khan MP, Singh AK, Singh AK, Shrivastava P, Tiwari MC, Nagar GK, Bora HK, Parameswaran V, Sanyal S, Bellare JR, Chattopadhyay N.	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	**J Bone Miner Res.,** 2015 Mar 27. doi: 10.1002/jbmr.2520.	6.832
Omer Ankur, Singh Poonam, Yadav Navneet Kumar, Singh Rama Kant	microRNAs: role in leukemia and their computational perspective	**Wiley Interdisciplinary Reviews-RNA,** 6, 1, 65-78	6.019
Tripathi Jitendra K., Kathuria Manoj, Kumar Amit, Mitra Kalyan, Ghosh Jimut K.	An Unprecedented alteration in mode of action of IsCT resulting its translocation into bacterial cytoplasm and inhibition of macromolecular syntheses	**Scientific Reports,** 5, 9127	5.578
Singh Vineeta, Praveen Vandana, Tripathi Divya, Haque Shafiul, Somvanshi Pallavi, Katti SB, and Tripathi CKM	Isolation, characterization and antifungal docking studies of wortmannin isolated from Penicillium radicum	**Scientific Reports,** 5, 11948	5.578
Sekhar Deepa, Singh Pooja, Kumar Sandeep, Singh Rajender,	RAD51 135G > C substitution increases breast cancer risk in an ethnic-specific manner: a meta-analysis on 21236 cases and 19407 controls	**Scientific Reports,** 5,11588	5.578
Singh Pramod K, Saxena Richa, Tiwari Sameer Singh Diwakar K, Singh Susmita K, Ruma Kumari & Srivastava Kishore K	RD-1 encoded EspJ protein gets phosphorylated prior to affect the growth and intracellular survival of mycobacteria	**Scientific Reports,** 5, 12717	5.578

PATENTS

Patents Granted Abroad

1. **JAPAN Patent No.:** 5719775 **Date of Grant:** 27.03.2015

   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

Patents Filed Abroad

1. **PCT Application No. :** PCT/IN2015/000235 **Date of Filing**: 10.06.2015

   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

Patents Granted in India

1. **Patent No**.: 266250 **Date of Grant**: 20.04.2015

   Title: An intra-vaginal abortifacient gel composition

   Inventors: Satywan B Jadhav, Rabi Sankar Bhatta, Man Mohan Singh & Girish Kumar Jain

Patents Filed in India

1. **Patent Application No. :** 1198DEL2015 **Date of Filing**: 30.04.2015

   Title: Antibody useful for the detection of cancer

   Inventors: Monika Sachdev, Parmita Kar, Saurabh Kumar, Deepshikha Tewari, Madan Lal Bhatt & Rekha Sachan

2. **Patent Application No**: 1942DEL2014 **Date of Filing**: 05.03.2015 (Prov.)

   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

HONOURS & AWARDS

CSIR-CDRI received **"Outstanding Translational Research Institute Award"** by South Asian Chapter of American College of Clinical Pharmacology (SAC-ACCP)

Awardees	Award
	**Dr. Atul Goel** • DAE-SRC Outstanding Investigator's Award 2014-15 • CRSI Bronze Medal by Chemical Research Society of India 2015 • CSIR Raman Fellowship Award 2015
	**Dr. Neeloo Singh** • Professor. B.K. Aikat Oration Award - 2012 by Indian Council of Medical Research India • Bharat Gaurav Award 2015 by India International Friendship Society
	**Dr. Mukesh Pasupuleti** • Outstanding Performers: Outstanding Student and Faculty Performers - A few case studies" in the book "PURSUIT OF BIOTECHNOLOGY Opportunities & Options" published by "Dept. of Biotechnology Ministry of Science & Technology Government of India".
	**Dr. Brijesh Kumar** • 10th Dr. PD Sethi Annual Award for Best Paper by KONGPOSH Publications Pvt. Ltd, (The Pharma Review), New Delhi • ACS Certificate of Membership Award 2015
	**Mr. Sharanbasappa S. Karade** (Student of Dr. J.V. Pratap) • Selected for Advance research at European Synchrotron Radiation Facility, Grenoble, France by Regional Centre for Biotechnology, Dept. of Biotechnology, Govt. of India

Major Events Organized

Visit of Honorable Minister for Science & Technology Dr Harsh Vardhan at CSIR-CDRI

Dr Harsh Vardhan, Union Minister for Science &Technology, visited CSIR-CDRI, Lucknow on 11th April 2015. On this occasion, he announced that the Indian pharmaceuticals sector would soon be showcasing 'candidate drugs' for malaria, osteoporosis and diabetes. The "candidate drugs" are currently undergoing clinical trials. He further announced that simultaneously, CSIR-CDRI is carrying out Investigational New Drug (IND) studies on lead molecules for fracture-healing, cancers, thrombosis, malaria and hyperglycemia.

The Minister said, "I am confident that the drug laboratories under CSIR are capable of backing up the Swasth Bharat Mission. Our scientists are focusing on both infectious and life-style diseases. We are developing next generation drugs, biologics, biosimilars, gene therapeutics, stem cell therapeutics, personalized medicine and multifunctional nanomedicine.

Honorable Minister said, "I am certain that India has the potential of becoming a global pharmaceutical powerhouse and in the process of putting some key enablers in place. These include giving the right incentives for R&D, forging alliances with the private sector and keeping an open mind on suggestions for fiscal relief to the private sector so that its role in R&D is enhanced. He said that in recent months he has visited a number of CSIR laboratories and is convinced that they have the competencies for new drug discovery and development including clinical trials, and has played a major role over the last six decades in the growth of pharmaceutical industry and education in India.

Earlier, addressing scientists at the CSIR-CDRI auditorium here, he made it clear that the Prime Minister is committed to making India one of the world's leading destinations for end-to-end drug discovery and innovation by 2020. "Strengthening of the R&D ecosystem is the priority". He also emphasized that the people of India are expecting that CSIR laboratories would be able to produce therapeutic and preventive measures for re-emerged infectious diseases like Dengue, Chikunguniya, Encephalitis, Swine Flu as well as conditions like Cancer, Diabetes, Osteoporosis, Hypertension, Depression and Ulcers. The Minister thanked representatives of the pharmaceutical private sector who were present on the occasion for supporting CSIR labs in bringing the products from the laboratory to the market.

Today, India ranks third in terms of volume of production with 10 percent share of the global market by volume and 14th largest by value. India is often dubbed the "Pharmacy of Developing World". Dr Harsh Vardhan however pointed out that India still has a long way to go in Pharma R&D. Moreover, India pharma needs to move from a phase of manufacturing to innovation. He expressed concern over the fact that currently, new drug R&D in India is mostly an affair of government organizations. "I request industry representatives to collaborate with CSIR laboratories in new drug R&D. The Prime Minister has given a call for Make in India. We need to generate millions of jobs in a couple of years because this country has a youth bulge. Seamless partnership will help develop products and technologies for the benefit of the common man," he pointed out. In this context licensing of a new botanical product CDR4744F004 for osteoporosis and Centbucridine (Local anaesthetic), IND Package for a new antithrombotic compound S007-867 and anti-stroke chemotype of Ashwagandha (NMITLI118RT+) are steps in right direction.

He announced that Government would soon set up the Biopharma Industry Incubator (BII) under the umbrella of CSIR-CDRI, Lucknow. It would strive to build a new generation of enterprises in the health care sector. The S&T Ministry is also considering setting up Government Laboratory Practices (GLP)-certified labs in CSIR-CDRI for complete range of Investigational New Drug (IND) studies. He said the step would foster new drug development as well as shore up the financial bottom line of the laboratory. Further, the Minister announced the formation of a National Centre for Laboratory Animals in the CSIR-CDRI new campus conforming to national and international guidelines. The new institution would serve as a referral centre for lab animal breeding and experimentation for new drug development.

Workshop on *in vivo* Imaging and Analysis

Under the CSIR-NWP Project "UNDO" (BSC0103) a 3 day workshop cum training program on *in vivo* Imaging and Analysis was conducted from 8-10 April, 2015 at the CSIR-Central Drug Research Institute. PhD scholars from various Divisions were participated in this training program and learned basic and practical applications of this advance technique.

CSIR-CDRI-BC Centre of Excellence in Flow Cytometry: Workshop on Flow Cytometry based Multicolour Immunophenotyping, Cell Cycle analysis and Apoptosis Assays

Under the aegis of CSIR-CDRI-Beckman Coulter Centre of Excellence in Flow Cytometry, a workshop cum hands on training experience was organized in the Division of Parasitology from 21st-

23rd April, 2015. The workshop modules were divided into lectures and hands on practical sessions over a three day period on Beckman Coulter Flow Cytometer FC 500. The three day workshop covered topics related to apoptosis and cell cycle analysis using Flow Cytometry. 12 students from various divisions of CSIR-CDRI learnt the basics of flow cytometry like instrument set-up, calibration, sample preparation, data analysis etc. The workshop was jointly conducted by Dr Ritesh Kumar- Application Specialist and Mrs Sakshi Paul- Product and Application Manager (both BC India Pvt. Ltd) and Dr Madhu Dikshit, Dr Shailja Bhattacharya, Dr Anuradha Dube, Dr Anil Gaikwad and Dr Mrigank Srivastava (all CSIR-CDRI). On the last day of the workshop, certificates for successful completion of the training were distributed to all the participants by Dr Madhu Dikshit (Director, CSIR-CDRI). Amit Rai (student of Dr Akhilesh Tamrakar) and Madhur Sachan (student of Dr Amit Misra) jointly received the first prize in Flow Cytometry quiz competition.

Swachchhta Abhiyan and Shramdaan Program

CSIR-CDRI is promoting Swachchhta Abhiyan among the staff, for this CDRI Staff Club organized a “Shramdaan” program on 15th May 2015. Director Dr Ram Vishwakarma, motivated the Scientist and research scholars of Institute and briefed about the

necessity and importance of cleanliness of campus. During the program all scientist and students in the leadership of Director participated enthusiastically for the Shramdaan in campus.

Dr Madhu Dikshit takes over the charge as Director

After 36 years of devoted research at CSIR-Central Drug Research Institute, Dr Madhu Dikshit has taken over the charge as the Director, CSIR-CDRI, Lucknow on 8th June 2015. She is the first woman Director in 64 years of glorious history of CDRI. Dr Dikshit has been conferred with several honours and accolades including elected fellowships (FNASc, FASc & FNA). She had contributed to more than 160 research publications of international repute.

Dr Madhu Dikshit while addressing the scientists, administrative staff and students of the Institute assured to work collectively keeping the legacy to serve the nation. She mentioned about earlier achievements made by previous Directors

and urged the staff to maintain same decorum in future also. Dr Dikshit emphasized on working proactively towards the mandate and invited optimum contribution from the existing good pool of scientists and infra-structure towards impact oriented applied and basic sciences.

All scientists, administrative staff and students extended their best wishes to Dr Madhu Dikshit for her able leadership and assured all possible cooperation.

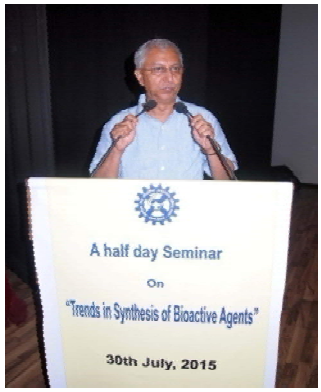
International Yoga Day Celebration

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 club also organized a Yoga Camp for all staff club members to celebrate the occasion. Institute's Controller of Administration, Mr Bijay Kumar Kar was the Yoga Guru on the occasion and many scientists and research scholars participated in it.

Half day Seminar on "Trends in Synthesis of Bioactive Agents"

To commemorate the superannuation of Dr Bijoy Kundu, HOD, Medicinal and Process Chemistry Division, a half day Seminar was organized by the MPC division in the CDRI auditorium on 30th July, 2015. The conference started by the inaugural function wherein Dr Madhu Dikshit welcomed the guest and speakers and detailed out the significant contributions made by Dr Kundu and Dr Shaw. The chief guest Dr Nautiyal recalled the interactions he and Dr Kundu had since early days of their respective research careers. Prof. Tandon delivered the presidential address highlighting some of the contributions of Dr Kundu.

The technical session was commenced with the talk by Prof K N Singh, BHU, Varanasi, Dr Ramesh Ram Panicker, of IIT, Kanpur. Besides this, three short talks were presented by Dr Jimut Ghosh, CDRI, Lucknow, Dr Namrata Rastogi, CDRI, Lucknow and Dr Devesh Sawant, Central Univ. of Rajasthan, Ajmer. Followed this, in the felicitation ceremony, Dr Kundu's students Manisha, Arunendra and Devesh recalled their experiences.



Namrata and Dipankar from CDRI and Dr Bhaduri and Dr Saxena as past HODs shared their reminiscence.Then Dr Rakesh Mauraya felicitated Dr Kundu by presenting a shawl and Dr Sanjay Batra presented a memoralia to him. There after Dr Kundu thanked all the members of Medicinal and Chemistry Division and spoke a few words of motivation. The program concluded by vote of thanks by Dr Sanjay Batra.

Students of Awadh International School, Faizabad visit

To initiate and promote experimentation and innovativeness in education and bringing confidence to society about relevance of Institute in terms of Social Impact, The students of class XI & XII from Awadh International School, Faizabad were invited on 21 August 2015 to visit CSIR-CDRI for motivating them to pursue their career in Science and explore the knowledge of Drug Discovery and Research. The students along with their faculties visited different divisions of the institute and interacted with the scientists

Communal Harmony Day (Sadbhawana Diwas) Celebration

"Sadbhawana Diwas" was celebrated in the institute on August 20, 2014 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.

The 54th Meeting of the CSIR-CDRI Research Council

The 54th Meeting of the CSIR-CDRI Research Council was held on August 24-25, 2015. A large number of Scientists and Research Students of the Institute actively participated in the meeting. Dr Madhu Dikshit, Director, CSIR-CDRI formally welcomed the Chairman and Members of the Research Council to the 54th Meeting. She added that it is the first meeting being convened after taking over as Director of this premier Institute. She will focus on the Institute's mandate of drug discovery and development. Prof. NK Ganguly in his opening remarks congratulated Dr Madhu Dikshit and hoped that Institute will do well in all fronts of new drug discovery and development. He added that approach for new drug discovery and development has changed a lot in recent years. After that approval

of the Minutes of the 53rd Research Council Meeting was done. Followed by this, presentation of Executive Summary of R & D activities by the Director and discussion on this presentation was done. Area Coordinators and Nodal Officers presented their work and Research Council members provided their feedback on the presentations. Research Council unanimously approved all the proposals and recommended for speedy implementation. Finally, Director CDRI thanked the Chairman and Members of the Council for their valuable inputs. She assured the members that appropriate action will be initiated based on their suggestions.

CSIR-CDRI-BC Centre of Excellence in Flow Cytometry: Workshop on Flow Cytometry based Multicolour Immuno-phenotyping, Cell Cycle analysis and Apoptosis Assays

Under the aegis of CSIR-CDRI-Beckman Coulter Centre of Excellence in Flow cytometry, a workshop cum hands on training experience was organized in the Division of Parasitology from 2nd-4th Sept, 2015. The workshop modules were divided into lectures and hands on practical sessions over a four day period on Beckman Coulter Flow cytometer FC 500. A total of 12 students were shortlisted for the three day workshop which focused on the theoretical and practical aspects of instrument set up and QC, including designing of compensation controls, multi-colour immunopheno-typing, cell cycle analysis and Annexin V-PI assays for assessment of apoptosis/ necrosis by Flow cytometry. The workshop was jointly conducted by Dr Amitav Mohanty – Manager Marketing, Mr Chandra Juvva- Application Specialist, Mr Chandra Mohan Gupta and Dayanand Tiwari- Area Sales Manager (all BC India Pvt. Ltd) and Dr Madhu Dikshit, Dr Shailja Bhattacharya, Dr Anuradha Dube, Dr Anil Gaikwad and Dr Mrigank Srivastava (all CSIR-CDRI). On the last day of the workshop, certificates for successful completion of the training were distributed to all participants by Dr Shailja Bhattacharya (Chief Scientist and HOD Parasitology Division) and Dr Anuradha Dube (Chief Scientist Parasitology Division). Sneha Ratnapriya (student of Dr

Anuradha Dube) and Alok Mishra (student of Dr K K Srivastava) jointly received the first prize in Flow cytometry quiz competition.

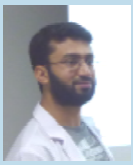
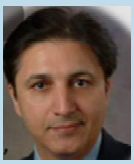
Study tour of Medical Officers

A group of six MD (Community Health Administration) students along with two faculties from National Institute of Health and Family Welfare, New Delhi which is an autonomous institute under the Ministry of Health and Family Welfare, Govt. of India has visited the Institute on 7th September, 2015. The major objective of the study tour was, to understand the functioning of the organization and role of CDRI in Health and family welfare. The delegates interacted with scientists of various divisions and visited major facilities of Institute.

Hands on Training Workshop in NMR for small molecules: Theory & Practice

SAIF Division, CDRI organized two-day Hands on training workshop in NMR for small molecules on 10th - 11th September, 2015. The goal of the workshop was to train the attendees about the fundamentals of NMR instrumentation and thorough knowledge of its applications. Scholars were armed with valuable skills and experience to take them back to their lab. The workshop was limited for 16 research scholars who are involved in Organic Synthesis. Participants learned the deep intricacies of the techniques.

Distinguished Visitors & Lectures

	Speaker & Address	Title of Lecture	Date
	**Dr Farid Ahmed** Ludwing Maximilians University Munich, Germany	Rational Combination of Experimental Drugs for the Treatment of Acute Myeloid Leukemia: In vitro Studies	23.07.2015
	**Dr Sanjay V Malhotra** Associate Professor, Stanford School of Medicine, Stanford University, USA	Designing Drugs against Proteins-proteins interactions and Drug Resistance	27.07.2015
	**Prof Virinder S Parmar** Professor of organic Chemistry & Head, University of Delhi (India)	Biocatalytic Synthesis of Novel Polymeric Advanced Materials for Applications in Health and Industrial Sectors.	03.08.2015
	**Dr Prakash Chand** Ex-Scientist, NISCAIR, New Delhi	Indian Citation Index, ICI	07.08.2015
	**Dr Rajeev K Tyagi** Biomedical Parasitology Unit, Institute Pasteur, Paris, France	*Plasmodium falciparum* infected mouse-human chimera(s): more than a tour de force	09.09.2015
	**Dr Sushil Kumar** Dean & Professor, Centre for Business Sustainability, Indian Institute of Management, Lucknow	Leadership in large Scientific Organizations	16.09.2015

Deputations Abroad

Name of Scientist	Country of Visit	Purpose of Visit	Period of Deputation
Dr. Neena Goyal	Germany	Invited in mid-term meeting of European Research consortium NMTryp (New Medicines for Trypanosomatidic infections)	9th to 11th September 2015
Dr. Sanjay Batra	UK	To attend the "22nd Grasmere Heterocyclic Symposium 2015	07th to 11th May2015

STAFF NEWS

(April - September 2015)

Director

Dr Madhu Dikshit, Director, CSIR-CDRI (08.06.2015)

New Scientist In-charge of Divisions

- **Dr RK Singh**, Sr. Principal Scientist, Toxicology Division
- **Dr AK Balapure**, Chief Scientist, Biochemistry Division
- **Dr Rakesh Maurya**, Chief Scientist, MPC Division
- **Dr Neena Goyal**, Sr. Principal Scientist, Academic Affairs Unit

Promotions

Sr. Principal Scientist to Chief Scientist

- **Dr AK Shaw**, MPC Division (Retd on 31.7.2015)
- **Dr AK Srivastava**, Biochemistry Division
- **Dr Kanchan Hajela**, Biochemistry Division
- **Dr Neeraj Sinha**, Toxicology Division (Retd on 31.7.2015)
- **Dr Wahajul Haq**, MPC Division

Sr. Technical Officer (3) to Principal Technical Officer

- **Mr Shyamendra Mehrotra**, Microbiology Division (Retd. on 31.08.2014)
- **Mr Suresh Chandra**, MPC Division (Retd on 31.8.15)
- **Dr SPS Bhandari**, MPC Division (Retd. on 31.10.2014)
- **Mr Bikram Benarjee**, Microbiology Division
- **Mr SNA Rizvi**, Laboratory Animal Facility
- **Mr Amresh Kumar Verma**, Knowledge Resource Centre (Advance Assessment)
- **Mrs Madhuri Choudhary**, Pharmaceutics Division (Retd. on 31.05.2013)

Sr. Technical Officer (2) to Sr. Technical Officer (3)

- **Mr JP Srivastava**, MSB Division
- **Mr RK Srivastava**, MSB Division

Medical Officer Group III (3) to Medical Officer Group III (4)

- **Dr Nimesh Kumar Srivastava**, CSIR Dispensary

Technical Officer to Sr. Technical Officer (1)

- **Mr Sanjay Kumar** (Other Lab Services)
- **Mr Atma Prakash Dwivedi**, MPC Division (2 Yr Advance Assessment)
- **Dr Sandeep Kumar Sharma**, Microbiology Division (2 Yr Advance Assessment)
- **Dr Ruchir Kant**, MSB Division (2 Yr Advance Assessment)

Sr. Technician (2) to Sr. Technician (3)

- **Mr HU Khan**, CSIR Dispensary (Retd. on 30.06.2015)
- **Mr Bhim Prasad Sunwar**, Lab Engg Services

Sr. Technician (1) to Sr. Technician (2)

- **Mr GC Roy**, Lab Engg Services

Technical Assistant to Technical Officer

- **Dr (Mrs) Shail Singh**, Clinical & Experimental Medicine (2 Yr Advance Assessment)

Technician (1) to Technician (2)

- **Mr HR Mishra**, MPC Division
- **Mr NP Mishra**, MPC Division
- **Mr Krishna Kumar**, MPC Division
- **Mr Sushil Kumar**, S&T Management Unit

Lab Attendant (2) to Lab Assistant

- **Mr Ramesh Chandra**, Lab Engg Services

Lab Attendant (1) to Lab Attendant (2)

- **Mr Sandeep Roy**, Lab Engg Services
- **Mr Ram Bhajan Shukla**, Pharmacokinetics Division
- **Mr Ravi Shankar Mishra**, Microbiology Division
- **Mr Janki Sharan Singh**, SAIF
- **Mr NK Khanduri**, Botany Division
- **Mr Dheerendra Mishra**, Lab Engg Services
- **Mr Lalji Prasad**, Bill Section
- **Mr Vikramditya**, Lab Engg Services
- **Mr Mohd Irfan**, Lab Engg Services
- **Mr Prem Babu**, Parasitology Division
- **Mr Ram Karan**, Endocrinology Division
- **Mr Ram Kumar**, Toxicology Division
- **Mr Nand Kishore Manjhi**, Director Office
- **Mr Ram Prakash**, Microbiology Division
- **Mr Raju Vishwakarma**, Lab Engg Services
- **Mr Ram Avtar**, Lab Engg Services
- **Mr Hariom Garg**, Lab Engg Services
- **Mr Ram Chandra Maurya**, Botany Division
- **Mrs Savitri Devi**, Clinical & Experimental Medicine
- **Mr Vinod Kumar Sharma**, Bill Section
- **Mrs Lakhana Devi**, Botany Division

Internal Transfers

- **Dr SR Kulkarni**, Scientist, S & T Management Unit to Business Development & Intellectual Property Unit
- **Mrs Preeti Agarwal**, Technician (1) S & T Management Unit to Business Development & Intellectual Property Unit
- **Mr Jitendra Patel**, Sr. Steno (H) S & T Management Unit to Stores & Purchase Section

External Transfers

- **Mr Bhaskar Kumar Ravi**, Section Officer (Finance & Accounts) from CSIR-NIO Goa to CSIR-CDRI Lucknow

Superannuation

- **Dr SPS Gaur**, Chief Scientist, Clinical & Experimental Medicine (30.04.2015)
- **Dr JS Srivastava**, Chief Scientist, Clinical & Experimental Medicine (30.04.2015)
- **Dr SK Singh**, Senior Principal Scientist, Pharmacokinetics and Metabolism (30.04.2015)
- **Mr PK Bhattacharya**, Senior Technician (2), Endocrinology (30.06.2015)
- **Dr AK Srivastava**, Senior Principal Scientist, Biochemistry (30.06.2015)
- **Mr SC Tripathi**, Principal Technical Office**,** MPC Division (30.06.2015)
- **Mrs Kamlesh P. Ballaney**, Private Secretary, Stores & Purchase (30.06.2015)
- **Mr KK Mishra**, Asstt. (S& P) Gr. II ACP, Stores & Purchase (30.06.2015)
- **Mr PK Bhattacharya**, Sr. Technician (2), Endocrinology (30.06.2015)
- **Mr RC Bisht**, Asstt. (F & A) Gr. I, Finance & Accounts (30.06.2015)
- **Mr HU Khan**, Sr. Technician (2)**,** CSIR Dispensary (30.06.2015)
- **Mr RP Maurya**, Laboratory Animals Facility (30.06.2015)
- **Dr Rajendra Prasad**, Chief Scientist, Business Development and Intellectual Property Unit (31.07.2015)
- **Dr Bijoy Kundu**, Chief Scientist, MPC Division (31.07.2015)
- **Dr AK Shaw**, Sr. Principal Scientist, MPC Division (31.07.2015)
- **Mr RM Pathak**, Sr. Technical Officer (3), Knowledge Resource Centre (31.07.2015)
- **Mr Chattar Pal**, Sr. Technician (2), Endocrinology (31.07.2015)
- **Mr Suresh Chandra**, Sr. Technical Officer (3) MPC Division (31.08.2015)
- **Mr Krishna Prasad**, Senior Technician (2) S & T Management Unit (31.08.2015)
- **Mr Kesav Prasad**, Principal Technical Officer, MPC Division (31.08.2015)
- **Dr SK Sinha**, Chief Scientist, Biochemistry Division (31.08.2015)