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CDRI Newsletter

Central Drug Research Institute, CSIR

From the Director's Desk

I am privileged to present before you the first issue of CDRI Newsletter. Ever since my joining CDRI as Director in December 2008, I was keen to bring out a document, which would provide an overview of our activities. The first issue of the Newsletter gives an idea of the Institute's reforms during the last 6 months i.e. April 2009 to September 2009. CDRI has a very productive past and its contributions, in terms of new drugs released for marketing, process technologies licensed for commercialization, human resource development, national and international collaborations, generation of new knowledge, etc. have been greatly appreciated world-wide. However, during this period, we have reorganized our research activities so as to produce quality research and develop newer substances at par with globally acceptable regulations and GLP guidelines and become a world class center for drug research in India.

World Intellectual Property Organization (WIPO) declared April 26th as the World Intellectual Property Day. To commensurate the occasion, an IPR Awareness Workshop was successfully organized. Focal theme of the workshop was traditional health systems. Besides organizing lectures on the theme, a special supplement of Drugs and Pharmaceuticals Industry Highlights was published. During the period of report, CDRI has done exceptionally well in terms of high quality research publications, grant of international and national patents. Several prestigious projects were initiated and new ones got sanctioned. Important new leads have been identified for further development as drugs. Besides, many of our scientists have won several national and international awards for their scientific contributions. I congratulate all of them and wish them and others for many more such prizes in the coming days.

September 26, 2009, the Foundation Day of CSIR, had a special occasion in the history of CDRI as we were bestowed with the prestigious CSIR Technology Award for Innovation 2009. I compliment all of my colleagues, both in scientific laboratories and in administration, for their wholehearted support for presenting CDRI as one of the best laboratories in India. We feel immensely proud of our institute. Best wishes.

T. K. Chakraborty

(Tushar Kanti Chakraborty)

CSIR Technology Award for Innovation - 2009

CDRI received the Technology Award for the year 2009 towards the discovery and development of two new synthetic endoperoxide antimalarials as synthetic substitute for drugs based on Artemisinin, derived from the plant *Artemisia annua.*

Artemisinin based combination therapy has been recommended by WHO for the treatment of *Plasmodium falciparum* malaria. A synthetic derivative of artemisinin will be a major breakthrough in cost effective management of falciparum malaria and multi drug resistant falciparum malaria in clinical practice. The compound is being developed to meet the new global challenges of the malaria incidence covering 300-400 million patients every year including the Indian population of around 3 millions.

The compounds 97/78 and 99/411 are found to be safe in animals. Phase I clinical trials of compound 97/78 is being carried out at PGIMER, Chandigarh in order to assess its safety and tolerability after getting the necessary approval from DCG(I). So far, 29 healthy male volunteers have completed phase I single oral dose trial out of 50 cases. The preclinical studies of compound 99/411 have been completed and the data is being compiled for IND (Investigational New Drug) submission to DCGI in order to obtain the permission to initiate Phase I clinical trials in human.

For further development and commercialization of these drugs at affordable price to common people, CDRI has already obtained its patent rights and licensed the technology to Ipca Laboratories Ltd., Mumbai.

A Newsletter from
Central Drug Research Institute
(Council of Scientific and Industrial Research, New Delhi)
Chattar Manzil Palace, M.G. Marg, Lucknow - 226 001
Phone: 0522-2612411-18 (PABX)
Fax: 91-522-2623405/2623938/2629504
Website: www.cdriindia.org

केन्द्रीय औषधि अनुसंधान संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्)
छत्तर मंजिल, पोस्ट बाक्स सं॰173 लखनऊ-226 001

R & D Highlights

I. Restructuring of the R&D Programmes

The new drug development program of CDRI had been focusing around 12 project areas for quite some time. In order to avoid overlapping of research activities, strengthen the work force, reallocation of resources, effective monitoring, coordination, focused development and chalk out the entire road map of CDRI R&D tasks, the existing project areas have been restructured into 5 disease areas and 1 safety and clinical development area. Details of restructured disease areas are presented below:

Disease Area	Area Coordinator	Area Leader(s)	Assistant Coordinator
Tuberculosis & Microbial Infections	Dr. A.K. Saxena	Dr. Ranjana Srivastava (*Microbial Infections*) Dr. Sudhir Sinha (*Biological Screening*)	Dr. B.N. Singh
Reproductive Health Research, Diabetes & Energy Metabolism	Dr. Naibedya Chattopadhyay	Dr. Arvind Srivastava *(Diabetes and Energy Metabolism)* Dr. Naibedya Chattopadhyay *(Reproductive Health Research)*	Dr. S. Sanyal
Malaria & other Parasitic Diseases	Dr. S.K. Puri	Dr. S.K. Puri *(Malaria)* Dr. S. Bhattacharya *(Filariasis)* Dr. Anuradha Dubey *(Leishmaniasis)*	Dr. Saman Habib
CVS, CNS & Related Disorders	Dr. Madhu Dikshit	Dr. Ram Raghubir *(Pharmacology)* Dr. G. Palit *(Neuropharmacology)* Dr. Madhu Dikshit *(Cardiovascular Pharmacology)*	Dr. K.V. Sashidhara
Cancer & Related Areas	Dr. S.B. Katti	Dr. Rakesh Maurya *(Natural Products)*	Dr. D.P. Mishra
Safety & Clinical Development	Dr. C. Nath	Dr. Ram Raghubir *(Safety Pharmacology)* Dr. C. Nath *(Regulatory Toxicology)* Dr. S.P.S. Gaur *(Clinical & Exp. Medicine)* Dr. G.K. Jain *(Pharmacokinetics & Metabolism)* Dr. A.K. Dwivedi *(Pharmaceutics)*	Dr. Amit Misra

Dr. Vinod Bhakuni: Scientific Adviser

Dr. A.K. Saxena: Technological Adviser

II. Discovery and development of standardised fractions and lead compounds for optimum bone health and treatment of osteoporosis.

Diseases related to bones and joints enjoy a variety of recommended remedies in ethno-traditional practice. Accelerated loss of bone after menopause, accompanied by reduced ability to form new bone, give rise to menopausal osteoporosis. An estimated 350 million Indians suffer from osteoporosis. Bone mass and strength achieved at the end of the growth period, so-called peak bone achievement, play pivotal roles in increasing the risk of osteoporosis fractures occurring after menopause. Women in India have precariously low peak bone achievement that makes them particularly susceptible to severe osteoporosis. Estrogen, a hormone secreted from the ovary, which maintains bone health during the reproductive phase of women's life becomes deficient in menopause. As a result, there is a growing interest in assessing the role of plants and plant-derived compounds in the prevention of menopausal osteoporosis. Many bioactive compounds, so-called phytoestrogens, have been discovered from plants. These include flavonoids and phenolic acids, which show antioxidant properties and may act as estrogen receptor activators (agonists) with beneficial outcomes in menopausal osteoporosis but are devoid of the harmful side effects of estrogen in menopausal women.

Several plants, as described in Indian folklore for their use in bone-related disorders, were screened. Out of these, two plants, coded as 914 and 1020, were found to promote peak bone mass (PBM) achievement and prevented bone loss in ovariectomized rats (removal of ovaries to render them osteoporotic). Initial studies regarding their bone forming ability and prevention of bone loss in female rats were made from the ethanol extracts of stem bark of both plants. Subsequently, various solvent extracts were made from the original ethanol extracts that finally led to the identification of fraction having enhanced activity due to enrichment of the phytochemicals responsible for the bone forming action. These phytochemicals were then purified and characterized from those solvent fractions. One of the major safety requirements for any agent to be used in menopausal women is to ensure its lack of estrogen-'like' effect in uterus. None of the extracts or fractions or the individual phytochemicals exhibited estrogen like effect in uterus.

Most of the phytochemicals (to be called as pure compounds henceforth) having bone forming action are synthesized in CDRI although a few are continued to be isolated from the plant source for further studies as their

Prof. Samir K. Brahmachari, DG, CSIR addressing CDRI staff during his visit to CDRI

complex structures require longer optimization to synthesize. Although rare to obtain novel compounds from terrestrial plant source, a pure and novel compound (K058) having potent bone forming action have been isolated from 914, which is being further developed as an anti-osteoporotic agent. Notwithstanding a robust bone forming action, another natural compound, 1020/K095 could not be developed as a drug for osteoporosis as it is a known compound and hence does not have IPR value. Synthesis of a series of novel compounds using 1020/K095 scaffold was therefore undertaken and one of them viz. S-007-1500, from this series, is being developed as a rapid fracture-healing agent.

Two standardized fractions, one each from 914 and 1020 are being developed with the aim to market as herbal/nutraceutic products for optimum bone health. Given the low PBM achievement among Indian women, these fractions would be greatly beneficial for promoting it. Higher PBM in turn would help alleviating the severity of osteoporosis later in life.

III. Discovery and development of compound S-003-296, a novel non-detergent extremely potent spermicide.

In order to have successful programs for controlling population growth, sexually transmitted diseases (including HIV) and unplanned/unwanted pregnancies, it is necessary to have spermicides capable of killing 100% human sperm almost instantaneously at physiological concentrations. However, the molecules designed for such activity often impact normal vaginal cells (cervico-vaginal epithelia) and natural protective vaginal flora (lactobacilli) adversely. A healthy cervico-vaginal epithelia and protective vaginal flora are crucial in maintaining the natural barrier to invasion by pathogens, especially the HIV.

Nonoxynol-9 (N-9), the active ingredient in most of the vaginal contraceptives available in market, is one such

molecule that kills sperm, bacteria and virus by its strong surfactant action. However, N-9 also kills cervico-vaginal cells and lactobacillus, inducing an inflammatory response that causes lesions and increased (rather than decreased) incidence of STDs and HIV in users. Recently, World Health Organization and U.S. Food and Drug Administration have issued caution against the use of N-9 containing contraceptives by people indulging in high-risk sexual behavior. Hence novel molecules with specific mode of action are required that can target sperm cells very precisely in the vagina while remaining practically inert to the adjoining cervico-vaginal cells, at contraceptive doses.

Our enduring efforts to design, synthesize and evaluate novel molecules with a specific, mechanism-based action on sperm cells resulted in several series of potent non-detergent structures. Recently, we discovered a novel non-detergent spermicidal compound, S-003-296, with extremely potent spermicidal action that was capable of killing 100% human sperm in <30 seconds at just 4% of the concentration required by N-9 and it does not destabilize the cell membrane. Instead, S-003-296 affects electrical communication elicited by sperm cell membrane and interferes with sperm's cellular acid-base balance, thus causing immobilization and death of sperms. Furthermore, unlike N-9, S-003-296 has negligible effect, if any on cervico-vaginal cells and lactobacilli. Together, S-003-296 appears to be the most potent and safest spermicide to be discovered so far. Studies are currently underway to develop it as a vaginally usable formulation.

IV. Discovery and development of anti-ulcer natural product WG176P.

Peptic ulcer being the most prevalent gastrointestinal disorder continues to occupy the key position in concern of both clinical practitioner and researchers. As a result more and more drugs, both herbal and synthetic, are coming up offering newer and better options for treatment of peptic ulcer. The type of drug varies from being a proton pump inhibitors to H2 receptor antagonists and cytoprotective agents as sucralfate. At the same time, each of these drugs confers simpler to severe side effects like arrythmias, gynaecomastia, enterochromaffin like cell (ECL) hyperplasia and haematopoeitic changes. This mark the major thrust area of research at present that mainly revolves around the search of an indigenous drug possessing fewer side effects to have a better and safer alternative for the treatment of peptic ulcer. In this regard, extensive studies are on their way mainly focusing on search of an anti-ulcer agent of plant origin.

Under CSIR coordinated programme, a natural product, coded as Batch No 18 of WGI76P, at 100 mg/kg, p.o. showed highly significant anti-ulcer activity against various acute gastric and duodenal ulcer models in rats and guinea pigs respectively and comparable to standard anti-ulcer drugs and significantly increased mucin secretion suggesting its cytoprotective potential. In addition, it also significantly inhibited the enzymatic activity of H+K+ATPase (proton pump) in gastric microsomes as compared to omeprazole, confirming its anti-secretory activity. It also showed significant ulcer healing effect in chronic gastric ulcer model in rats which might be through the attenuation of proinflammatory cytokines, TNF-α and upregulating the gene expression of VEGF growth factor. Safety regulatory studies indicate wide margin of safety and does not affect the vital physiological functions - CNS, CVS and respiratory system even with five times of effective dose. An acute toxicological study has been completed and no adverse effect was rendered by the compound. Chronic Toxicity studies are under progress. Furthermore, it was identified for IND filing and Arya Vadiya Sala have taken this product for commercializa-tion and marketing.

A view of CSIR Foundation Day Celebrations held at CDRI (Left) and at Science Convention Centre, Lucknow (Right)

New Projects Undertaken

I. Synthesis of biologically active molecules from carbohydrates based ligands for potential application in defence (Sponsored by DRDO); *PI: Dr. R P Tripathi*

Surveys on sugar based compounds, displaying important pharmacological activities, have established the position and linkage of carbohydrate ligands which offers selectivity in biological response. The bioavailability is one of the hurdles to develop new drugs for humans use. Another problem, associated with the bioactive compounds, is presence of chiral centres in the molecule and it is a well known fact that biological activities are time dependent on a particular configuration of the asymmetric centre present in the molecule. Therefore, it was proposed to synthesise certain bioactive compounds either from simple mono- and di-saccharides and/or glycosylate them to optically pure bioavailable product. The compounds, thus synthesized, would be screened for different biological activities. It is also proposed that these compounds would also be screened against toxicants at DRDE, Gwalior, a reputed laboratory of Defence Research and Development Organization, New Delhi. Thus, it is a joint collaborative work between CDRI (CSIR) and DRDE (DRDO) to develop new molecules as chemotherapeutics and as detoxicants.

II. Evaluation of DNA based tools for antimalarial drug screening against *P. falciparum* and studies with modified (RPNI) medium (Sponsored by ICMR); *PI: Dr. Kumkum Srivastava*

The emergence and spread of multi-drug resistant strains of *P. falciparum* and *P. vivax* and non-availability of potential antimalarial vaccines demand the development of new chemotherapeutic agents for treatment of malaria. The drug development program requires a foolproof model system to obtain quick and reliable results as well as rapid and inexpensive technique for quantification of drug efficacy. The success of *in vitro* cultivation of malaria parasite has come up as an easily approachable method to screen compounds against the target malaria parasite. However, the conventional method (microscopic examination of blood smears) for assessment of antimalarial activity of the compounds is labor intensive, time-consuming and demands trained personnel. The alternative standard methods are either radioactive incorporation to measure parasitic replication in red blood cells or colorimetric methods based on enzymatic activity rather than parasite replication. However, the colorimetric methods may subject to artefacts caused by pigments present in crude plant extract that are frequently used in drug screening programs. The microfluorimetric method has been reported as an alternative, simple, inexpensive, one-step assay, suitable for screening of large number of samples for antimalarial drug development. Besides, this use of transgenic parasites expressing green florescent protein (gfp) may prove an effective tool for antimalarial drug screening. The proposed programme is to observe comparative potential of these test techniques and make routine application for screening. Apart from this, the potential of modified (RPNI) medium is to be evaluated for chemosensitivity studies using various sera supplements.

III. Effect of monoisoamyl 2, 3-dimercaptosuccinic acid on cardiovascular and respiratory parameters in the rat (Sponsored by DRDO); *PI: Dr. Madhu Dikshit*

Arsenic is the most common cause of heavy metal poisoning in adults and children. Prolonged exposure to non-lethal doses of arsenic results in arsenicosis, a disease, characterized by dermatological features of pigmentation and keratosis. Other common systematic manifestations include neurological, haematological, gastrointestinal and respiratory complications.

A retrospective examination of various antidotes reveals that there is no global unanimity of opinion regarding the efficacy of a particular treatment regimen. Most of the conventional chelators are compromised with many side effects and drawbacks and there is no safe and effective treatment available for arsenic poisoning. Among the new chelators, monoisoamyl ester of DMSA has been found to be the most effective by the scientists at DRDE, Gwalior. The project aims to evaluate effect of this chelator at various doses on cardiovascular and respiratory parameters.

IV. Osteogenic actions of a naturally derived NP-1 pure compound on bone (Sponsored by DST); *PI: Dr. Divya Singh*

We propose to study medicarpin, a pure isolate of NP-1, which is derived from natural source (stem bark of *Butea monosperma*). The crude extract has shown considerable promise as a source of osteogenic agent(s) since it significantly promoted bone mineral density (BMD) in overiectomized (estrogen deficient) rats as well as mineralization of osteoblasts *in vitro*. Subsequently, several pure compounds were isolated. Preliminary *in vitro* biochemical assays such as cell proliferation and survival, differentiation and mineralization in osteoblasts revealed pure compound medicarpin to be the most effective. Besides, it leads to increased peak bone mass and bone strength in

A view of Special Review Meeting of MoES Project: "Drugs from Sea" with Dr. Shailesh Nayak, Secretary, MoES, (GoI), New Delhi.

growing rats. Since achieving a maximal peak bone mass, it may protect against the development of osteoporosis during later life. These observations prompted us to propose detailed studies to delineate cellular mechanism of action of medicarpin in osteoblasts. Successful completion of this study has the potential to qualify medicarpin as potential bone forming agent.

V. Development of bone anabolic agents from an Indian medicinal plant (Sponsored by ICMR); *PI: Dr. Naibedya Chattopadhyay*

We, at Central Drug Research Institute have identified a plant known in traditional medicine for fracture healing. However, this plant has not been investigated for its chemical, biological or pharmacological properties. In preliminary experiments, we observed that crude extracts of the selected medicinal plant has significant stimulatory action on the bone forming, osteoblasts. We, therefore, propose a detailed investigation of this plant in order to isolate and characterize the bone forming agent. Study design would be: i) bioassay (*in vitro* mineralization) guided fractionation, ii) identification of the most active compound by *in vitro*, and iii) determination of *in vivo* efficacy of the compound in osteoporotic rat model. If successfully developed, this study may help in developing a bone anabolic agent from indigenous natural source.

VI. Proteomic analysis of drug resistance in *Leishmania donovani* clinical isolates (Sponsored by DST); *PI: Dr. Neeloo Singh*

High-throughput proteomics is one of the most dynamically developing research areas. The whole protein content of a cell is digested, fractionated and analyzed in a completely automated way, including data analysis. In this study, we attempt to utilize 'expression proteomics' with the primary goal of mapping out the proteome of a clinical isolate of *Leishmania donovani* parasite and then to extend studies to 'quantitative proteomics' which will aim to compare the relative abundance of particular proteins within two proteome profiles viz. resistant versus sensitive phenotypes of the parasite. The production and basic characterization of good quality Leishmania proteome maps provides an essential first step towards comparative protein expression studies aimed at identifying the molecular determinants of parasite drug resistance. With our previous work utilizing microarray, through this proposal, we aim to make a link between those identified sequences and the functional proteins of the parasite involved in imparting drug resistance. This proposal constitutes the first proteomic analysis of drug resistance in clinical isolates in India and it is envisaged that it will present a clear identification of a primary drug resistance mechanism using this approach.

VII. Cloning and overexpression of Th1 stimulatory poly-proteins identified through proteomics for their prophylactic potential against experimental visceral leishmaniasis (Sponsored by DBT); *PI: Dr. Anuradha Dube*

Indian visceral leishmaniasis (VL) or Kala-azar is a severe and fatal disease. In the absence of good chemotherapeutic options and due to the problem of emerging drug resistance, there is a need for an effective, safe and a reliable vaccine against VL. To date, there is no vaccine against leishmaniasis. Our ultimate goal is to develop a suitable candidate vaccine for VL. The fact that large number of people in affected areas have self-cure with no clinical symptom and the ones, recovered from infection, are mostly protected from re-infection. This provides rationale for designing vaccines against VL.

Here we propose a study on the cloning and overexpression of Th1 stimulatory proteins from Leishmania promastigotes/amastigotes, identified through proteomics, for their potential as vaccines either as recombinant proteins or as DNA encoding genes (DNA Vaccination) and evaluating their potential protective role in hamster model of VL, which show similar clinico-pathological symptoms as in human.

VIII. Design, synthesis and development of novel antileishmanial agents (Sponsored by DST) *PI: Dr. T. Narender*

More than 12 millions individuals are infected by leishmaniasis around the world with 40000 new cases added

IPR Awareness Workshop

World Intellectual Property Organization (WIPO) declared April 26th as the World Intellectual Property Day. On this occasion, a halfday IPR Awareness Workshop was organized at the Institute. Focal theme of the workshop was Traditional Health Systems. Besides organizing lectures on the theme, a special supplement of Drugs and Pharmaceuticals Industry Highlights was published. Scientific and technical staff of CDRI and other Lucknow based academic institutions attended the workshop.

every year. In India, high incidence has been reported from Bihar, Assam, West Bengal and Eastern Uttar Pradesh. Treatment of leishmaniasis suffer from problems of drug resistance and severe toxicity. As a part of our drug discovery program, we isolated chromenodihydrochalcones, which have shown good *in vitro* antileishmanial activity. On the basis of this natural product lead, we synthesized large number of chromenochalcones and evaluated their antileishmanial activity and studied structure activity relationship. The most active compound in the *in vitro* system was also found active in *in vivo* experiments. Therefore, further studies will be undertaken to study the mode of action of the active compounds as part of this project to develop a potent antileishmnial drug.

IX. Effect of 2,3-diaryl-2H-1-benzopyran derivative on estrogen - induced endometrial cell proliferation and uterine hyperplasia formation (Sponsored by ICMR); *PI: Dr. Anila Dwivedi*

Endometrial carcinoma is one of the common malignancies in women; world-wide it is the fifth most common cancer in women. Furthermore, the incidence is increasing in developing countries since there is a steady increase in longevity and life style changes. Estrogens are known to play crucial role in the development of endometrial hyperplasia. Atypical hyperplasia, in particular, are likely precursors of endometrial adenocarcinoma. In a quest for the development of novel nonsteroidal estrogen antagonists, CDRI's efforts have led to the identification of benzopyran derivatives as potent SERMs with appreciable antiestrogenic profile. Based on preliminary data, it was hypothesised that 2,3-diaryl-2H-1-benzopyrans contribute mainly to the inhibition of uterine growth by virtue of its anti-estrogenic and anti-growth factor potentials. These observations prompted the investigators to evaluate the anti-proliferative effects in human endometrial adenocarcinoma cells and estrogen-induced uterine hyperplasia under the influence of hydroxyl derivative(s) of 2,3-diaryl-2H-1-benzopyran with a view to explore its anticancer/anti-hyperplastic potential in uterus. The studies, mentioned in the project, would explore the molecular mechanism of action of benzopyran derivative(s) at endometrial level and help in designing new strategies for the management of endometrial cancer and hyperplasia.

X. Design, synthesis and bioequivalence of new analogues of fluconazole for antifungal activity (Sponsored by ICMR); *PI: Dr. PK Shukla*

Fungal infections have become an important complication and a major cause of morbidity and mortality in immunocompromised individuals. Unfortunately none of the antifungals available in the market have broad spectrum of activity and are not free of side effects. Fluconazole has established an exceptional therapeutic record for *Candida* infections due to its remarkable efficacy, favorable pharmacokinetics and reassuring safety profile. However, increasing drug resistance has rendered it ineffective against many fungal strains. The proposed activities under the project include: synthesis of new analogues of fluconazole containing 1,2,3-triazole ring to improve its antifungal spectrum; replacement of both the 1,2,4-triazole rings of fluconazole by substituted or unsubstituted 1,2,3-triazole ring; synthesis of compounds containing 1,2,3-triazole ring and having other structural variations, evaluation of the new compounds for their efficacy against various fungi.

XI. Human cytochrome P4501B1: implications in Centchroman treated harmone mediated MCF-7 tumor cell metabolism as a novel target for therapeutic intervention (Sponsored by DST); *PI: Dr. Neetu Singh*

CYP1B1 is involved in breast cancer disease progression and it may also modulate the anti-estrogen treatment therapy. The localization of CYP1B1 is both nuclear and cytoplasmic, possibly modulating the effects in breast tissue. The proposed project utilizes the combination of Centchroman (CC) plus Resveratrol (RES) in evaluating their role in MCF-7 Human Breast Cancer cells in relation to the differential expression of CYP1B1. The basis of hydroxylation of CC vis-à-vis CYP1B1 is as yet unknown. Following the hypothesis that if CC increases

the expression of CYP1B1, it may partially be responsible for the conversion of E2 into the metabolite, which may subsequently increase the process of carcinogenesis. Since, previously it has been reported that Tamoxifen increases CYP1B1 expression, toxicity may result through the conversion of E2 into 4OH-E2. However, RES get metabolized by CYP1B1, it inhibits the phase-I drug activating enzymes. The combination of CC with RES may reduce the expression of CYP1B1 and furthermore lower toxicity through lesser conversion of E2 into 4OH-E2. These data could possibly explain the molecular mechanism governing the increased incidence of Breast Cancer during prolonged antiestrogen therapy.

XII. Identification and characterization of protein(s) from Arteether sensitive and Arteether resistant rodent malaria parasites for elucidation of mechanism of resistance (Sponsored by DST); *PI: Dr. SK Puri*

Emergence of resistance in malaria parasites is the most important subject of research. The national and international status of work related to action of artemisinine derivatives clearly indicate the need for continuing efforts to unravel the mechanism. The problem is compounded by the lack of clinical samples exhibiting resistance to this class of drugs. The availability of arteether resistant rodent model provides an opportunity to characterise significant differences in sensitive and resistant parasites employing biochemical/molecular techniques. Besides, studies on drug combinations would provide newer chemotherapeutic modalities to manage drug resistance to this class of drug.

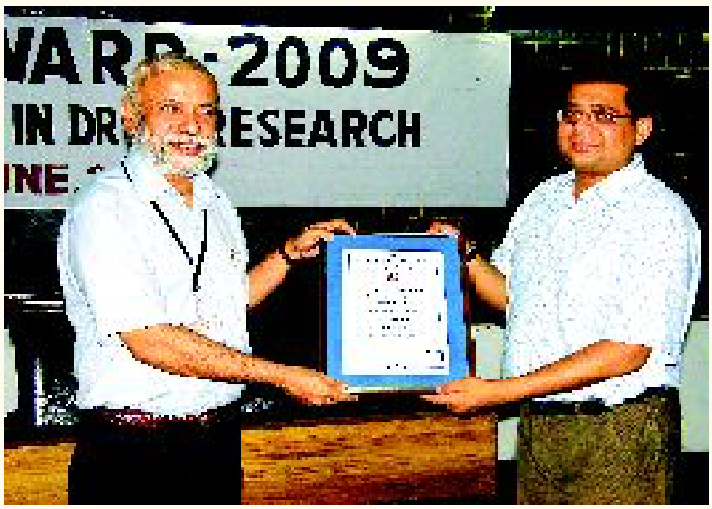
XIII. To supply the phytochemical references standard (PRS) to Indian Pharmacopoeia Commission, Govt. of India, Ghaziabad *PI: Dr. A.K. Saxena*

Pharmacopoeia is the book of standards published by Indian Government, (Ministry of Health and Family Welfare). This book prescribes the minimum quality standards that have to be met by all the drugs and pharmaceuticals that are offered for sale in India. It is interested to note that not just IP, but almost all Pharmacopoeia in the world have started including monographs on herbs and herbal products in their official publications.

For standardization of the herbal products, the Botanical Reference Standards (BRS) and Phytochemical Reference Standards (PRS) are required by the Indian Pharmacopoeia Commission for which it has made arrangements through a network of CSIR labs and other labs for preparation of PRS as markers for certification. The four CSIR labs participating in this project are: CDRI, CIMAP, NBRI and IIIM, Jammu.

CDRI AWARDS - 2009

CDRI Award was instituted in the year 2004 to recognize excellence in contribution of Indian researchers below 50 years of age working in the broad areas of drug research. A presentation ceremony of this award for the year 2009 for excellence in drug research was organized on June 12, 2009. **Prof. Sandeep Verma**, Indian Institute of Technology, Kanpur was selected and honoured on this day. He delivered his award oration "**Peptide Soft Structures: Application in Drug Discovery and Gene Delivery**". Dr. Nitya Nand, Ex Director, CDRI presided over the function.



Prof. Sandeep Verma, IIT, Kanpur receiving the Award from Dr. TK Chakraborty, Director, CDRI

NEW CONTRACTS/AGREEMENTS SIGNED/UNDERTAKEN

CDRI executed a Sponsored Project Agreement with Biocon Ltd., Bangalore

Towards boosting Industry-Academia Partnership for research and development, CDRI has entered into a sponsored project agreement with Biocon, for the development of a novel, non-infringing process for the synthesis of Bivaluridin, a 20-mer polypeptide used as thrombin inhibitor.

Dr. Vanita Sabahit, Deputy Manager, Strategic Project Coordinator, Biocon Ltd., Bangalore presenting the first installment of premiumto Dr. TK Chakraborty, Director, CDRI, Lucknow towards thesponsored project.

Nature of Agreement	Title	Industry/Institute	Date of Signing
Memorandum of Understanding	Synthesis, Molecular Modeling and Development of ER Dependent anti-cancer Agents	Amity Institute of Pharmacy, Amity University, Lucknow	14/09/09
Memorandum of Understanding	Setting of Phase I clinical facility	Seth GS Medical College & KEM Hospital, Mumbai	27/07/09
Secrecy Agreement	Center of Excellence in Clinical Trials	Vimta Labs Ltd., Hyderabad	25/07/09
Memorandum of Understanding	Leishmania induced non coding RNA manipulations in phagocytes and keratinocytes	Meharry Medical College, USA	16/07/09
Secrecy Agreement	Plant 914: Plant showing osteogenic activity	Supreem Pharmaceuticals, Mysore	15/07/09
Material Transfer Agreement	p 21-Promoter luciferase construct	John Hopkins Medical Institution, USA	02/06/09
Memorandum of Agreement	Anti-osteoclastogenic effect of 99/373 and its mode of action	Department of Biotechnology, New Delhi	02/06/09
Secrecy Agreement	*Butea monospora* – potent osteogenic activity	Natural Remedies Pvt. Ltd., Bangalore	27/05/09
Memorandum of Understanding	Association of CD36 locus with Type II Diabetes and related atherosclerosis	MHGL/ Lucknow University, Lucknow	19/05/09
Material Transfer Agreement	Recombinant clone of SHMT of *L. donovani* and the methodology of over expression of SHMT towards crystallographic studies	Molecular Biophysics Unit, Indian Institute of Science, Bangalore	13/05/09
Secrecy Agreement	Centchroman: Alternative use in the treatment of breast cancer	HLL Lifecare Limited, Kerala	02/04/09

NEW FACILITIES ESTABLISHED

1. Laboratory of Functional Genomics and Molecular Toxicology

The Division of Toxicology has added a new laboratory to its fold. The laboratory of 'Functional Genomics and Molecular Toxicology' spearheaded by Dr. Aamir Nazir, is utilizing the powerful genetics of model system *C. elegans* towards identifying genetic modulators/ targets of various human diseases employing transgenic and knock out mutant strains of model system *C. elegans*. The laboratory is also working towards establishing *C. elegans* as an alternate-to-animal model for toxicity testing in accordance with 3R's rule that aims at ***R***educing, ***R***efining and ***R***eplacing the use of animals. Model system *C. elegans* attains significance because of its 60-80% homology of gene sequences with that of humans, its genetic manipulability, invariant and fully described developmental program, well-characterized genome, ease of maintenance, short and prolific life cycle, and small body size. It is interesting to note that many of the disease genes and disease pathways in humans are conserved in C. *elegans;* also twelve out of seventeen known signal transduction pathways are conserved between humans and *C. elegans*.

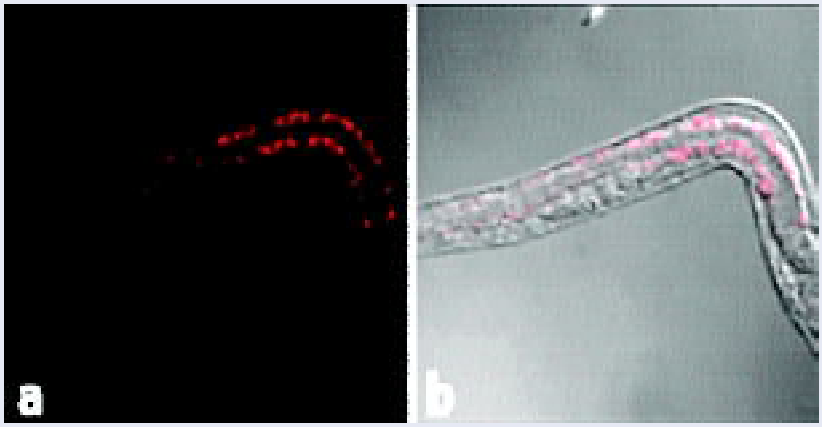


Image of C. elegans stained with Nile Red for localization of lipid deposits. *a)* ***Fluorescence microscopy image*** *b)* ***Image using DIC optics merged with fluorescence image.***

Taking advantage of the immense potential that model system *C. elegans* possesses, the Laboratory of Functional Genomics and Molecular Toxicology is aiming at establishing various disease models that would be employed in understanding of specific disease processes, identification of novel drug targets and screening of various candidate drug molecules. To this end, the lab has procured *C. elegans* models of Alzheimer's disease (Source: Link lab., University of Colorado, USA) that expresses 'human' amyloid beta, model of Parkinson's disease expressing 'human' alpha synuclein (Source: *C. elegans* Genetics Center, Minnesota, USA) and several other mutants and transgenic strains that would be used for understanding specific mechanistic aspects pertaining to human disease conditions. The disease models would also be used for screening potential pharmacological agents.

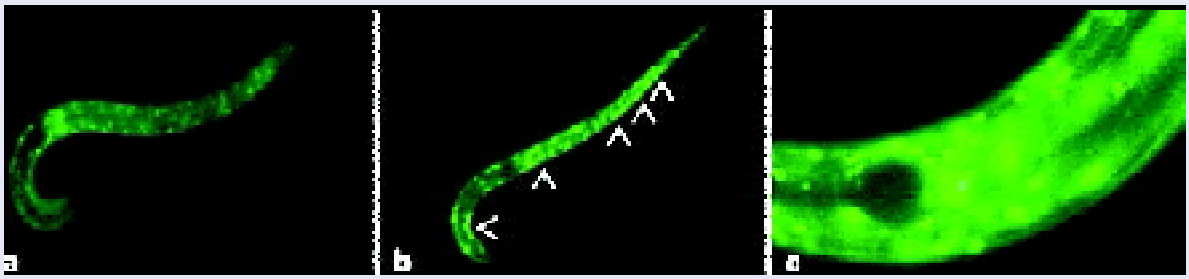


Image of a GFP tagged transgenic strain of C. elegans. *a)* ***Control,*** *b)* ***After treatment with a toxic protein,*** *c)* ***100X image of nematode treated with toxic protein.***

II. National Facility for Regulatory Pharmacology and Toxicology

A state-of-art "National Facility for Regulatory Pharmacology and Toxicology" has been established in the Pharmacokinetics Division, financially supported by DST, to generate safety and toxicity data that may help in preclinical development of a candidate molecule.

The facility comprises of:

Quality Assurance System for the proper planning, designing and execution of the experiments as well as for the recording, analysis, reporting and monitoring the quality control, pharmacokinetic, safety pharmacology and regulatory toxicity;

Well equipped Unit for quality control of test items for preclinical development;

Well equipped, furnished, environment controlled and pathogen free, dedicated animal facility to provide quality animals for undertaking regulatory pharmacokinetic studies, safety pharmacology and regulatory toxicity studies;

Adequately equipped facilities for regulatory pharmacokinetic, safety pharmacology and regulatory toxicity studies;

Central Documentation Control Unit for archiving of regulatory data as per guidelines;

CDRI GLP Directive Document to provide basic GLP guidelines for conduct of regulatory studies.

III. National Centre for Pharmacokinetic and Metabolic Studies

During this period National Centre for Pharmacokinetic and Metabolic Studies was established to generate the desired pharmacokinetic data that may help in selection of right candidate drug for the preclinical development that comprises of:

1. Triple quardupole LC MS/MS system;
2. Linear ion trap LC MS/MS system;
3. Automated bio-sample processing system;
4. Ultracentrifuge.

Functional High throughput Facility for Drug Metabolic and Pharmacokinetic studies

The facility will have following advantages:

Development of validated analytical procedures for finger printing and Principle Component Analysis (PCA) of multi-component herbal preparations of medicinal value using LC MS/MS systems;

Development of validated bio-analytical assay procedures for the quantification of NCEs and APIs in various biological matrices using LC MS/MS systems;

Developing protocols and procedures for processing and clean up of biological samples for quantitative analysis and integration of the whole process with LC MS/MS systems for quantitative analysis of NCEs and APIs in various biological matrices;

Undertaking following *in vitro* and *in vivo* DMPK studies, as per regulatory guidelines, utilizing conventional as well as by applying Cassette Dosing (N-in-One)/Sample Pooling Techniques which accelerate the work and aid in obtaining desired DMPK data in faster mode while a significant reduction in time, in the number of animals and samples handled can be achieved.

TOP 25 PUBLICATIONS

1. Jakobsson T, Venteclef N, Toresson G, Damdimopoulos AE, Ehrlund A, Lou X, Sanyal S, Steffensen KR, Gustafsson JA and Treuter E. GPS2 is required for cholesterol efflux by triggering histone demethylation, LXR recruitment, and coregulator assembly at the ABCG1 locus. Molecular Cell, 34(4), 510-518. (Impact Factor 12.903)

2. Sahasrabuddhe AA, Nayak RC and Gupta CM. Ancient Leishmania coronin (CRN12) is involved in microtubule remodeling during cytokinesis. Journal of Cell Science, 122(Pt 10), 1691-1699 (Impact Factor 6.247)

3. Samant M, Gupta R, Kumari S, Misra P, Khare P, Kushawaha PK, Sahasrabuddhe AA and Dube A. Immunization with the DNA-encoding N-terminal domain of proteophosphoglycan of Leishmania donovani generates Th1-Type immunoprotective response against experimental visceral leishmaniasis. The Journal of Immunology, 183(1), 470-479 (Impact Factor 6.0)

4. Yadav G, Prasad RLA, Jha BK, Rai V, Bhakuni V and Datta K. Evidence for inhibitory interaction of hyaluronan-binding protein 1 (HABP1/p32/gC1qR) with Streptococcus pneumoniae hyaluronidase. Journal of Biological Chemistry, 284(6), 3897-3905 (Impact Factor 5.52)

5. Mishra P and Bhakuni V. Self-assembly of bacteriophage-associated hyaluronate lyase (HYLP2) into an enzymatically active fibrillar film. Journal of Biological Chemistry, 284(8), 5240-5249 (Impact Factor 5.52)

6. Maity P, Bindu S, Dey S, Goyal M, Alam A, Pal C, Mitra K and Bandyopadhyay U. Indomethacin, a non-steroidal anti-inflammatory drug, develops gastropathy by inducing reactive oxygen species-mediated mitochondrial pathology and associated apoptosis in gastric mucosa a novel role of mitochondrial aconitase oxidation. Journal of Biological Chemistry, 284(5), 3058-3068 (Impact Factor 5.52)

7. Saquib M, Husain I, Kumar B and Shaw AK. Facile synthesis of enantiomerically pure 2- and 2,3-disubstituted furans catalysed by mixed lewis acids: An easy route to 3-iodofurans and (hydroxymethyl) furans. Chemistry -A European Journal, 15(24), 6041-6049 (Impact Factor 5.454)

8. Dey S, Guha M, Alam A, Goyal M, Bindu S, Pal C, Maity P, Mitra K and Bandyopadhyay U. Malarial infection develops mitochondrial pathology and mitochondrial oxidative stress to promote hepatocyte apoptosis. *Free Radical Biology and Medicine*, 46(2), 271-281 (Impact Factor 5.399)

9. Goel A, Chaurasia S, Dixit M, Kumar V, Prakash S, Jena B, Verma JK, Jain M, Anand RS and Manoharan SS. Donor-acceptor 9-uncapped fluorenes and fluorenones as stable blue light emitters. *Organic Letters*, 11(6), 1289-1292 (Impact Factor 5.128)

10. Lahiri S, Singh P, Singh S, Rasheed N, Palit G and Pant KK. Melatonin protects against experimental reflux esophagitis. *Journal of Pineal Research*, 46(2), 207-213 (Impact Factor 5.056)

11. Singh S, Singh K, Patel DK, Singh C, Nath C, Singh VK, Singh RK and Singh MP. The expression of CYP2D22: An ortholog of human CYP2D6, in mouse striatum and its modulation in 1-methyl 4-phenyl-1,2,3,6-tetrahydropyridine-induced Parkinson's disease phenotype and nicotine-mediated neuroprotection. *Rejuvenation Research*, 12(3), 185-197 (Impact Factor 5.008)

12. Kumari S, Samant M, Khare P, Misra P, Dutta S, Kolli BK, Sharma S, Chang KP and Dube A. Photodynamic

Publication Profile in 2008: at a Glance		
Papers in SCI Journals	:	246
Papers in Non-SCI Journals	:	25
Total Papers	:	271
Total IF Value	:	585.17
IF/Per paper (SCI Papers only)	:	2.378
IF/Scientist	:	3.751
Papers in Various IF Ranges		
No Papers in IF >5	:	12
No Papers in IF >4<5	:	19
No Papers in IF >3<4	:	23
No Papers in IF >2<3	:	92
No Papers in IF >1<2	:	52
No Papers in IF <1	:	48

vaccination of hamsters with inducible suicidal mutants of Leishmania amazonensis elicits immunity against visceral leishmaniasis. *European Journal of Immunology,* 39(1), 178-191 (Impact Factor 4.865)

13. Sharan K, Siddiqui JA, Swarnkar G, Maurya R and Chattopadhyay N. Role of phytochemicals in the prevention of menopausal bone loss: evidence from *in vitro* and *in vivo*, human interventional and pharmacokinetic studies. *Current Medicinal Chemistry,* 16(9), 138-157 (Impact Factor 4.823)

14. Dube A, Gupta R and Singh N. Reporter genes facilitating discovery of drugs targeting protozoan parasites. Trends in Parasitology 25(9), 432-9 (Impact Factor 4.690)

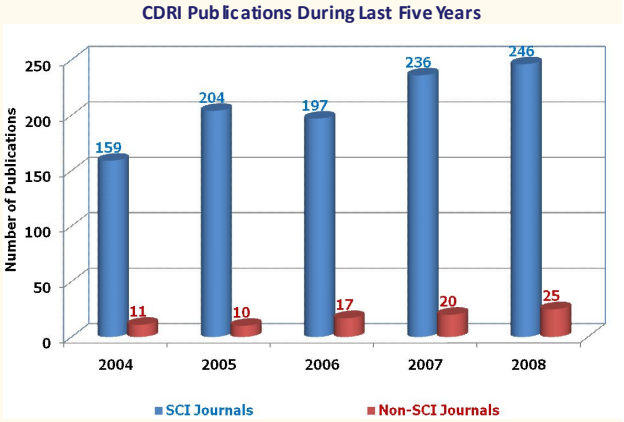
15. Chandra Ram, Bharagava Ram Naresh, Rai Vibhuti and Singh Shio Kumar. Characterization of sucrose-glutamic acid maillard products (SGMPs) degrading bacteria and their metabolites. *Bioresource Technology,* 100, 6665-6668 (Impact Factor 4.453)

16. Singh N, Gupta R, Jaiswal AK, Sundar S and Dube A. Transgenic *Leishmania donovani* clinical isolates expressing green fluorescent protein constitutively for rapid and reliable *ex vivo* drug screening. *Journal of Antimicrobial Chemotherapy,* 64(2), 370-374 (Impact Factor 4.328)

17. Gupta A, Bhakta S, Kundu S, Gupta M, Srivastava BS and Srivastava R. Fast-growing, non-infectious and intracellularly surviving drug-resistant *Mycobacterium aurum*: a model for high-throughput antituberculosis drug screening. *Journal of Antimicrobial Chemotherapy,* 64(4), 774-781 (Impact Factor 4.328)

18. Yadav SP, Ahmad A, Pandey BK, Singh D, Asthana N, Verma R, Tripathi RK and Ghosh JK. A peptide derived from the putative transmembrane domain in the tail region of *E coli* toxin hemolysin E assembles in phospholipid membrane and exhibits lytic activity to human red blood cells: Plausible implications in the toxic activity of the protein. *Biochimica et Biophysica Acta– Biomembranes,* 1788(2), 538-550 (Impact Factor 4.18)

19. Makker A, Tandon I, Goel MM, Singh M and Singh MM. Effect of ormeloxifene, a selective estrogen receptor modulator, on biomarkers of endometrial receptivity and pinopode development and its relation to fertility and infertility in Indian subjects. *Fertility and Sterility,* 91(6), 2298-307 (Impact Factor 4.167)



20. Jain RK, Jain A, Maikhuri JP, Sharma VL, Dwivedi AK, Kumar ST, Mitra K, Bajpai VK and Gupta G. *In vitro* testing of rationally designed spermicides for selectively targeting human sperm in vagina to ensure safe contraception. *Human Reproduction,* 24(3), 590-601 (Impact Factor 3.773)

21. Kumar A, Chaturvedi V, Bhatnagar S, Sinha S and Siddiqi MI. Knowledge based identification of potent antitubercular compounds using structure based virtual screening and structure interaction fingerprints. *Journal of Chemical Information and Modeling,* 49(1), 35-42 (Impact Factor 3.643)

22. Chaudhary SS, Roy KK and Saxena AK. Consensus superiority of the pharmacophore-based alignment, over maximum common substructure (MCS): 3D-QSAR studies on carbamates as acetylcholinesterase inhibitors. *Journal of Chemical Information and Modeling,* 49(6), 1590-1601 (Impact Factor 3.643)

23. Singh AK and Singh BN. Differential expression of sigH paralogs during growth and under different stress conditions in *Mycobacterium smegmatis*. *Journal of Bacteriology,* 191(8), 2888-2893 (Impact Factor 3.636)

24. Trivedi R, Kumar A, Gupta V, Kumar S, Nagar GK, Romero JR, Dwivedi AK and Chattopadhyay N. Effects of Egb 761 on bone mineral density, bone microstructure, and osteoblast function: Possible roles of quercetin and kaempferol. *Molecular and Cellular Endocrinology,* 302(1), 86-91 (Impact Factor 3.611)

25. Singh V, Tiwari RL, Dikshit M and Barthwal MK. Models to study atherosclerosis: A mechanistic insight. *Current Vascular Pharmacology,* 7, 75-109 (Impact Factor 3.582)

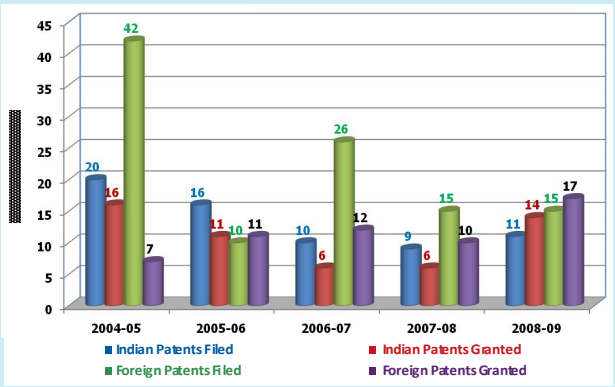
PATENTS

Patents Granted Abroad: 6
Patents Granted in India: 2
Patents Filed Abroad: 2

Patents Granted Abroad

1.	**European Pat. No.:**	1453528	**Grant Date:**	22/07/2009
	Patent Appl. No.:	2781641.2	**Filing Date:**	15/06/2004
	Title:	**Herbal medicaments for treatment of neurocerebrovascular disorders**		
	Inventors:	Madhur Ray, Raghwendra Pal, Satyawan Singh & Nandoo Mal Khanna		
	Supporting Staff	Jharna Arun & Madhuri Chaudhari		
2.	**Canadian Pat. No:**	2512508	**Grant Date:**	9/6/2009
	Patent Appl. No.:	2512508	**Filing Date:**	30/6/2005
	Title:	**Process for preparing guggulsterones**		
	Inventors:	Ram Pratap, Dharmendra Pratap Singh, Raghwendra Pal & Satyawan Singh		
3.	**Mexican Pat. No.:**	266702	**Grant Date:**	13/05/2009
	Patent Appl. No.:	PA/A/2004/05680	**Filing Date:**	11/06/2004
	Title:	**A composition for treating neurocerebrovascular disorders**		
	Inventors:	Madhur Ray, Raghwendra Pal, Satyawan Singh & Nandoo Mal Khanna		
4.	**Ukrainian Pat. No.:**	86600	**Grant Date:**	12/05/2009
	Patent Appl. No.:	a200605416	**Filing Date:**	22/10/2003
	title:	**Biodegradable, inhalable microparticles containing antitubercular drugs**		
	Inventors:	Amit Mishra, Himadri Sen, Suryakumar, Rakesh Sinha & Rolee Sharma		
5.	**Sri Lankan Pat. No.:**	14128	**Grant Date:**	30/04/2009
	Patent Appl. No.:	14128	**Filing Date:**	20/06/2006
	Title:	**Process for isolation of saponin tigogenin pentaglycoside**		
	Inventors:	Vijay Lakshmi, Kartikay Pandey, Raja Roy, Bhawani Shanker Joshi, Kunnath Padmanabhan Madhusudanan, Ramesh Chandra, Arvind Kumar Srivastava, Deepak Raina & Anil Kumar Rastogi		
	Supporting Staff	AK Khanna		
6.	**Sri Lankan Pat. No.:**	14131	**Grant Date:**	30/04/2009
	Patent Appl. No.:	14131	**Filing Date:**	20/06/2006
	Title:	**Improved process for isolation of Bisvittoside D from Sea cucumber**		
	Inventors:	Vijay Lakshmi, Ajet Saxena, Kartikay Pandey, Kunnath Padmanabhan Madhusudanan, Mahendra Nath Srivastava, Zafar Kamal Khan, Pooja Jain, Gopal Gupta & Janak Dulari Dhar		
	Supporting Staff	JP Maikhuri		

Patents Filed and Granted During Last Five Years



Patents Granted in India

1. **Patent No.:** 234487 **Grant Date:** 01/06/2009
   Patent Appl. No.: 1364DEL2003 **Filing Date:** 06/11/2003
   Title: **α substituted naphthyloxy-ω-substituted alkyl/aryl amino substituted alkane derivatives as agents for the treatment or prophylaxis of diabetes and related metabolic disorders**
   Inventors: Devdutt Chaturvedi, Atul Kumar, Reema Rastogi, Arvind Srivastava, Priti Tewari, Rehan Ahmad, Ramesh Chander, Anju Puri, Geetika Bhatia, Farhan Rizvi, Anil Kumar Rastogi & Suprabhat Ray
   Supporting Staff: Vasi Ahmed
2. **Patent No.:** 233980 **Grant Date:** 24/04/2009
   Patent Appl. No.: 0774DEL2002 **Filing Date:** 25/07/2002
   Title: **Novel synthesis of organic carbamates**
   Inventors: Devdutt Chaturvedi, Atul Kumar, Reema Rastogi & Suprabhat Ray
   Supporting Staff Vasi Ahmed

Patents Filed Abroad

1. **PCT Patent Appl. No.:** PCT/IN2009/000285 **Filing Date:** 14/05/2009
   Title: **Substituted benzfurochromenes and related compounds for the prevention and treatment of bone related disorders**
   Inventors: Atul Goel, Amit Kumar, Sumit Chaurasia, Divya Singh, Abnish Kumar Gautam, Rashmi Pandey, Ritu Trivedi, Man Mohan Singh, Naibedya Chattopadhyay, Lakshmi Manickavasagam, Girish Kumar Jain & Anil Kumar Dwivedi
   Supporting Staff: Abdul Malik & Avinash Kumar
2. **Viet Nam Patent Appl. No.:** 1-2009-00832 **Filing Date:** 27/04/2009
   Title: **Novel 6-(1-aryl ethyl)-1, 2, 4-trioxanes, useful as antimalarial agents, and a process for the preparation theirof**
   Inventors: Chandan Singh, Ajit Shankar Singh & Sunil Kumar Puri
   Supporting Staff: Shashi Rastogi, Akhilesh Srivastava & Kamlesh Singh

CDRI's Patents In-Force: Distribution across the World

ARIPO	1
Australia	5
Bangladesh	2
Belgium	2
Canada	3
China	3
Denmark	1
EURASIAN	1
EUROPEAN	18
France	2
Great Britain	6
Germany	2
Georgia	1
Indonesia	1
Israel	1
Japan	3
Latvia	1
Malaysia	2
Mexico	1
Netherlands	2

OAPI	1
Pakistan	2
Philippines	1
Peru	1
Russia	1
Sierra Leone	2
Lithuania	1
Singapore	2
Slovenia	1
South Africa	6
Sri Lanka	3
Switzerland	1
Ukraine	2
USA	36
Uzbekistan	1
Viet Nam	1

India 366

DISTINGUISHED VISITORS AND LECTURES

Name of the Visitor	Title of Lecture Delivered	Date
Dr. Amit Singh University of Albama, Birmingham, USA.	*Mycobacterium tuberculosis* Redox Sensing Mechanisms: Linking Environmental Cues and Virulence Pathways	09.04.09
Dr. R.K. Sunil Singh Institute of Molecular Medicine, New Delhi.	Visualizing Transcription At a Genetic Locus	27.04.09
Dr. P.K. Jadhav Senior Research Fellow Lilly Research Laboratories, USA.	Eli Lilly Asia Outstanding Thesis Awards: Eligibility and Selection Process	29.04.09
Prof. Simeon Arseniyadis Institute de Chimie des Substances Naturelles CNRS, Gif-sur-Yveette, France.	The Domino and Chiral Pool Approaches as Problem Solving Tools in Biologically Active Natural Product Synthesis	05.05.09
Dr. Mukund S. Chorghade President, Chorghade Enterprises THINQ Pharma, USA.	Bridging the Innovation Deficit using Natural Products as an Inspiration: Reverse Pharmacology and Systems Approaches for Drug Discovery	22.05.09
Dr. Denis Martin Project Manager Drugs for Neglected Diseases, Geneva.	DNDi: Advancing Research and Development Projects Through Partnership – Focus on Visceral Leishmaniasis	26.05.09
Dr. Ashoke Sharon Department of Applied Chemistry Birla Institute of Technology, Mesra, Ranchi.	Structure Based Approach Towards Antiviral Drug Discovery	02.06.09
Dr. Saurabh Singh Department of Molecular, Cellular and Craniofacial Biology University of Louisville Birth Defects Center Louisville, KY, USA.	Cellular and Molecular Mechanisms of Environmental Toxins in Development	01.07.09
Prof. Subho Mazumdar University of Delhi, Delhi.	The Fascinating Science of Nanoparticle Technology: Synthesis to Drug Delivery	10.07.09
Dr. Ning Ke Head, Functional Genomics Acea Biosciences, San Diego, USA.	Applications in Drug Discovery, RNAi Study, Cell Invasion / Migration	21.07.09
Dr. Barry M. Trost Professor of Chemistry Stanford University USA.	Cyclo-additions via TMM-Pd Intermediates: New Strategies for Asymmetric Induction and Total Synthesis	07.08.09
Dr. Ampapathi Ravi Sankar National Institute of Health, Frederick, USA.	Structural Studies on Transcriptional Factor STAT4: Enzymatic Domain of Cholera Toxin	24.08.09
Dr. Robert Rice Scientist, Qiagen, Germany.	High Resolution Melt Curve Analysis – Revolution in DNA Analysis for SNPs and Genotyping	2.9.09
Dr. Alexander Stadler Application Specialist Microwave Synthesis, Anton Parr, Austria.	New Development in Microwave Assisted Synthesis in Organic Chemistry	9.9.09
Dr. Arunava Dasgupta Max Plank Institute for Infection Biology Berlin, Germany.	Fight Against Tuberculosis, the Ancient Disease that has Taken a Deadly New Turn	17.9.09
Prof. H. Sakurai Institute for Molecular Science, Japan	Gold nanocluster as Unique catalyst under Aerobic condition	23.9.09

राजभाषा अनुभाग

केन्द्रीय औषधि अनुसंधान संस्थान, लखनऊ में दो दिवसीय सामूहिक हिन्दी कार्यशाला का आयोजन दिनांक 29-30 जून, 2009 को संस्थान के लघु प्रेक्षागृह में किया गया जिसमें नराकास, लखनऊ के समस्त सदस्य कार्यालयों के अधिकारियों/कर्मचारियों के साथ-साथ संस्थान के अधिकारियों/कर्मचारियों ने भी भाग लिया। इस अवसर पर उद्घाटन सत्र में संस्थान के वरिष्ठ हिन्दी अधिकारी एवं सचिव (नराकास) डॉ. विजय नारायण तिवारी ने राजभाषा नीति पर अपना व्याख्यान प्रस्तुत किया तथा श्री ए.पी. राय, वरिष्ठ भू-वैज्ञानिक ने ***''यूनीकोड फांट की सहायता से कम्प्यूटरों पर हिन्दी में कार्य करने की संभावनाएं''*** विषय पर अपना व्याख्यान दिया। श्री पवन कुमार जैन, मैनेजर (राजभाषा), डॉ. राजबहादुर सिंह, उपनिदेशक (राजभाषा), एवं डॉ. एस.के. तिवारी, वैज्ञानिक ने इस अवसर पर प्रमुख वक्ताओं के रूप में अपना-अपना व्याख्यान प्रस्तुत किया। दिनांक 30 जून, 2009 को चतुर्थ सत्र के बाद डॉ. वी.एन. तिवारी के धन्यवाद ज्ञापन के पश्चात् कार्यशाला का समापन किया गया।

नगर राजभाषा कार्यान्वयन समिति, लखनऊ की छमाही बैठक दिनांक 27 अगस्त, 2009 को केन्द्रीय औषधि अनुसंधान संस्थान, लखनऊ के लघु प्रेक्षागृह में सम्पन्न हुई। बैठक की अध्यक्षता के निदेशक एवं अध्यक्ष (नगर राजभाषा कार्यान्वयन समिति, लखनऊ) डॉ. टी.के. चक्रवर्ती ने की। इस अवसर पर संस्थान के वरिष्ठ हिन्दी अधिकारी एवं सचिव (नराकास) डॉ. विजय नारायण तिवारी ने अध्यक्ष महोदय तथा उपस्थित सभी विभागाध्यक्षों/कार्यालय प्रमुखों, हिन्दी अधिकारियों एवं अन्य कार्यालय प्रतिनिधियों का हार्दिक स्वागत करते हुए 120 कार्यालयों की समीक्षा करते हुए कार्यसूची के अनुसार अध्यक्ष महोदय की अनुमति से समीक्षा रिपोर्ट प्रस्तुत की। इस अवसर पर तीन कार्यालयों को विशिष्ट पुरस्कार तथा प्रशस्ति पत्र एवं दस अन्य कार्यालयों को पुरस्कृत किया गया तथा 38 कार्यालयों को समाप्त छमाही के दौरान कार्यशाला हेतु प्रशस्ति पत्र प्रदान किये गये। इस अवसर पर भारत सरकार, गृह मंत्रालय राजभाषा विभाग द्वारा पधारे उपनिदेशक (कार्यान्वयन उत्तर क्षेत्र) डॉ. सरोज कुमारी त्रिपाठी ने अपना व्याख्यान दिया। अपर महाप्रबंधक, एच.ए.एल. श्री पी.सी. त्रिपाठी ने धन्यवाद ज्ञापित करते हुए नराकास के विभिन्न सदस्य कार्यालयों से पधारे कार्यालय प्रमुखों के सहयोग के लिए आभार प्रकट किया।

Dr.Barry M.Trost, Professorof Chemistry,Stanford University, USA delivering thelecture duringhis visitto CDRI

केन्द्रीय औषधि अनुसंधान संस्थान, लखनऊ में दिनांक 14 सितम्बर, 2009 के मध्य हिन्दी पखवाड़े का आयोजन किया गया। हिन्दी पखवाड़े का उद्घाटन दिनांक 14 सितम्बर, 2009 को पूर्वाह्न 11.00 बजे संस्थान के लघु प्रेक्षागृह में किया गया।

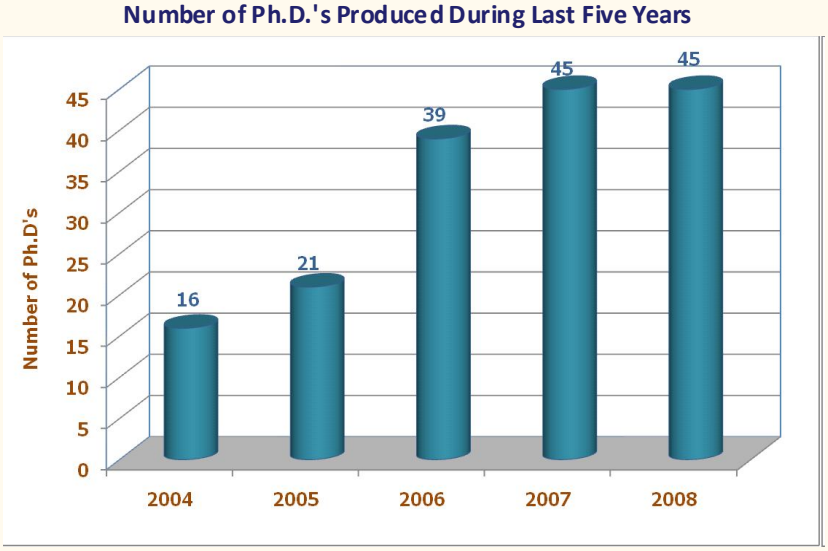
इस अवसर पर प्रो. एस.पी. दीक्षित, पूर्व विभागाध्यक्ष, हिन्दी विभाग, लखनऊ विश्वविद्यालय, लखनऊ ने मुख्य अतिथि के रूप में व्याख्यान दिया। पखवाड़े के दौरान विभिन्न प्रतियोगिताओं का आयोजन किया गया जिसमें संस्थान के कर्मचारियों तथा नराकास, लखनऊ के सदस्य कार्यालयों ने भाग लिया। दिनांक 29 सितम्बर 2009 को पखवाड़े का समापन समारोह आयोजित किया गया जिसमें मुख्य अतिथि के रूप में पधारे डॉ. योगेश प्रवीण ने लखनऊ की संस्कृति एवं भाषा पर व्याख्यान प्रस्तुत किया तथा उनके द्वारा प्रतियोगिताओं में विजयी प्रतिभागियों को पुरस्कृत किया गया। समापन समारोह के दौरान एक हास्य कवि सम्मेलन का भी आयोजन किया गया। डॉ. विजय नारायण तिवारी, सचिव नराकास के धन्यवाद ज्ञापन के पश्चात् हिन्दी पखवाड़े का समापन किया गया।

HUMAN RESOURCE DEVELOPMENT

Ph.D. Thesis Submitted/Awarded

Sl. No.	Name of the Research Fellow	Title of the Ph.D. Thesis/Supervisor	Name of the University
1.	**RK Asthana**	Isolation and characterisation of antidiabetic agents from Indian medicinal plants/*Dr. A.K. Saxena*	Dr. BR Ambedkar University, Agra
2.	**Venkata Prasuja Nakka**	Cellular and molecular studies on the endoplasmic reticulum mediated survival and death mechanism in cerebral ischemia/*Dr. Ram Raghubir*	JNU, New Delhi
3.	**Mohammad Hassam**	Antimalarial 1,2,4-trioxanes: Synthesis and biological evaluation/ *Dr. Chandan Singh*	JNU, New Delhi
4.	**GB Shiva Keshava**	Secretory proteome analysis of *Candida albicans* for identification of potential target molecules/*Dr. PK Shukla*	JNU, New Delhi
5.	**Kancharla Papi Reddy**	Isolation, characterization, chemical transformation and total synthesis of natural products of biological importance/*Dr. T Narendra*	Acharya Nagarjuna University
6.	**Maloy Kumar Parai**	Design, synthesis and evaluation of bioactive privileged structures for drug discovery/*Dr. Gautam Panda*	Jadavpur University, Kolkata
7.	**Geetika Kharkwal**	A comparative study of estrogen receptor under the influence of CDRI 99/373 and SERMs/*Dr. Anila Dwivedi*	JNU, New Delhi
8.	**Anil Dangi**	Characterization of protein profile of filarial parasite *Brugia malayi* after depletion of intracellular endosymbiotic bacteria *Wolbachia* through antibiotics and development of antibiotic delivery system for antifilarial targeting/ *Dr. Shailja Bhattacharya*	CSJM University, Kanpur
9.	**Sharad Porwal**	Synthesis of heterocycles of biological interest and their combinatorial chemistry/*Dr. PMS Chauhan*	Dr. BR Ambedkar University, Agra
10.	**Ravi Shankar**	Search of new lead bioactive molecules with potential for drug development/*Dr. Kanchan Hajela*	Dr. BR Ambedkar University, Agra
11.	**Avadh Bihari Yadav**	Transcriptional analysis of microphage response to tuberculosis infections on treatment with bio-degradable microparticals containing anti-TB drugs/*Dr. Amit Mishra*	JNU, New Delhi
12.	**Anchal Gusain**	Studies on the potential role of calcineurin in cerebral ischemia / reperfusion injury/*Dr. Ram Raghubir*	Jiwaji University, Gwalior
13.	**Vikas Jain**	Colloidal delivery system bearing antibiotic for treatment of septic shock/*Dr. R Pal & Dr. PR Misra*	JNU, New Delhi
14.	**Shawon Lahiri**	A study on the role of peroxisome proliferation activated receptor gamma (PPAR-gamma) in gastric ulcer healing/*Dr. Gautam Palit*	Jadavpur University, Kolkata
15.	**Awanish Kumar**	Expression proteomics and genomic fingerprinting studies in sodium antimony gluconate (SAG) sensitive and resistant clinical isolates of *Leishmania donovani*/*Dr. Anuradha Dube*	JNU, New Delhi
16.	**Ram Awatar Maurya**	Desugn and synthesis of MCR derived novel nuclear receptor modulators as therapeutic agents/*Dr. Atul Kumar*	JNU, New Delhi
17.	**Gauri Misra**	Structural studies on proteins involved in transit peptide mediated transport in *Plasmodium falciparum*/*Dr. R. Ravishankar*	JNU, New Delhi
18.	**Vishal Kumar Rajput**	Synthesis of biologically active oligosaccharides and medicinally relevant sugar heterocycles hybrids/ *Dr. Balaram Mukhopadhyay & Dr. B Kundu*	JNU, New Delhi
19.	**Alok Ranjan Singh**	Molecular and biochemical studies on hexokinase of filarial parasite/ *Dr. JK Saxena*	BHU, Varanasi
20.	**Swati Gupta**	Studies on hepatocarcinogenesis-promotion potential of certain antidiabetic PPAR-gama-agonists in rat/ *Dr. PSR Murthy*	Kanpur University
21.	**J. Naga Rosaiah**	Synthesis, reactivity and anticancer evaluation of novel derivatives of aromatic dicarbaldehydes/*Dr. KV Sasidhara*	Acharya Nagarjuna University
22.	**Nagarapu Srinivas**	Design and synthesis of potential antileishmanial agents/*Dr. Kalpana Bhandari*	Acharya Nagarjuna University
23.	**Shivendra Kumar Chaurasiya**	Studies on the inter-relationship between protein kinases of macrophage and mycobacteria for their roles as determinant of pathogenicity/ *Dr. KK Srivastava*	JNU, New Delhi
24.	**Vandana Varshney**	Synthesis of pharmacodynamic compounds/Dr. DP Sahu	Dr. BR Ambedkar University, Agra

25.	**Shailesh Kumar**	Studies on diversity oriented synthesis of bioactive compounds/*Dr. DP Sahu*	JNU, New Delhi
26.	**Amar Bhadur Singh**	Biochemical and molecular targets of novel antidiabetic agents/*Dr. Arvind Kumar Srivastava*	JNU, New Delhi
27.	**Divya Dube**	Identification and optimization of novel inhibitors against proteinaceous drug targets from pathogenic species using *in silico* approaches/*Dr. R. Ravishankar*	JNU, New Delhi
28.	**Sunil Sharma**	Design and synthesis of imidazole based biheterocycle derivatives of medicinal interest/*Dr. Bijoy Kundu*	Dr. BR Ambedkar University, Agra
29.	**Amita Yadav**	Studies of rpf (resuscitation promoting factor) genes of *Mycobacterium tuberculosis*/*Dr. Ranjana Srivastava*	JNU, New Delhi
30	**Sumit Chaurasia**	Studies on isolated or fused 2-pyranones and their nucleophile induced products/*Dr. Atul Goel*	JNU, New Delhi
31.	**Shweta Joshi**	Molecular and biochemical characterization of transkeyolase of *Plasmodium falciparum*/*Dr. JK Saxena*	Lucknow University
32.	**Sachin Kumar**	Role of nitric oxide in neutrophil maturation and function/Dr. Madhu Dikshit	JNU, New Delhi
33.	**Ashutosh**	Differential gene expression studies to explore the molecular mechanism of drug resistance in *Leishmania donovani* isolates/*Dr. Neena Goyal*	JNU, New Delhi
34.	**Meghna Singh**	Molecular cloning and characterization of functional antigen/s of human lymphatic filariid *Brugia malayi*/*Dr. Shailja Bhattacharya*	JNU, New Delhi
35.	**TV Satish Tammana**	Functional and structural characterization of ADF/Cofilin homologue from *Leishmania donovani*/*Dr. CM Gupta*	JNU, New Delhi
36.	**Naikade Niraj Krishna**	Structurally simple synthetic peroxides: Synthesis and antimalarial assessment/*Dr. Chandan Singh & Dr. AK Saxena*	JNU, New Delhi
37.	**Richa Verma**	Studies on phospholipid membrane interaction of peptides derived from the conserved segments of voltage gated potassium channels/*Dr. JK Ghosh*	CSM University, Kanpur
38.	**Shilpy Shakya**	Purification and characterization of adult *Brugia malayi* antigen: Identification and immunoprophylactic evaluation of protective molecule(s)/ *Dr. Shailja Bhattacharya*	CSM University, Kanpur
39.	**Vishal Ranjan**	Redox mechanisms in Centchroman mediated antineoplasticity in human breast cancer cells / *Dr. Anil Balapure*	Allahabad University
40.	**Manisha Nigam**	Study of the molecular mechanisms of antiestrogens Centchroman induced apoptosis in MCF-7 and NDA MB-231 human breast cancer cells /*Dr. Anil Balapure*	Allahabad University
41.	**Ranjeet Kumar**	Structural and functional studies on isocitrate lyase and malate synthase from *Mycobacterium tuberculosis* / *Dr. Vinod Bhakuni*	JNU, New Delhi
42.	**Malaya Kumar Sahoo**	Studies on immunogenecity and pathogenicity of certain molecules of *Brugia malayi* adult worms in rodent host / *Dr. Kalpana Murthy*	JNU, New Delhi

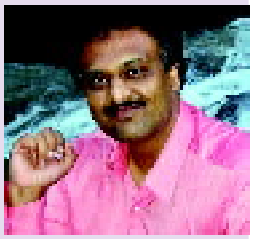


HONOURS & AWARDS

Dr. CM Gupta received the prestigious **Distinguished Biotechnology Research Professorship Award** from Department of Biotechnology, Government of India in recognition of his outstanding research contributions. During his total scientific career of about 37 years, he has made several significant contributions to a number of areas related to chemistry and biology, viz. new drug design and development, immunomodulation, liposomes as new drug delivery systems, phospholipid and C-nucleoside synthesis, membrane phospholipid organization and dynamics, and role of cytoskeleton - membrane bilayer (or cytosolic protein) associations in regulating the membrane structure, dynamics and functions. These studies have resulted in publication of about 110 original research papers, 10 review articles, 5 book chapters and 5 patents.

Dr. Ashim Ghatak has been awarded "Dr. Coelho Memorial Oration in Experimental Medicine – 2009" of The Association of Physicians of India (API) – delivered on 1st February, 2009 during the Annual Conference of APICON 2009 held in Delhi from 29th January to 2nd February , 2009. Topic of the Oration was "High Oxidant Stress, Depleted Nitric Oxide System and Hyperhomocysteinemia – A Triple Jeopardy in Indian Patients with Hypertension". This award included honorarium, a certificate and a medal.

Dr. Manoj K Barthwal, Scientist, CVS Unit, Division of Pharmacology, received the **International Atherosclerosis Society (IAS) Visiting Fellowship Award 2009.** The IAS, incorporated in 1979, promotes at an international level, the advancement of science, research and teaching in the field of atherosclerosis. This award is given by the society since 1991 to young scientists working in the area of Atherosclerosis after peer review by the IAS Fellowship Review Committee. The visiting fellowship is for working at the Experimental Atherosclerosis Division of National Heart, Lung and Blood Institute (NHLBI), National Institute of Health (NIH), Bethesda, Maryland, USA.



Dr. Ravishankar's important contributions, especially on the carbohydrate analogs, has led to the inclusion of his name as the **Advisory Board Member of the international journal 'Trends in Carbohydrate Chemistry'.** The group is currently exploring the potential interactions of the enzyme with other putative partners like the *M. tuberculosis* b-clamp and clamp loader proteins. It is also exploring the molecular details of the involvement of the enzyme in the two major DNA repair pathways viz. homologous recombination and non-homologous end-joining processes.

Dr. Anil Kumar Saxena Chaired the session "OMIC"-Sciences and Bioinformatics (II) in 5th International Symposium on Computational Methods in Toxicology and Pharmacology Integrating Internet Resources

(CMTPI-2009), 4-8th July 2009, at Istanbul, Turkey. In this session, Prof. K. Funatsu (Japan) gave a major talk on topic "Development of a method for predicting metabolites by using chemoinformatics methods". The other oral presentations included in this session were by Prof. Marjana Novic (Slovenia: Chemometrics exploration of trans membrane proteins available in the public databases. From statistical models towards structure and mechanism of transport), Prof. M.C. Ferreira (Brazil: LQTA-QSAR: A new 4D-QSAR methodology) and Prof. A. Tsantili-Kakoulidodu (Greece: A QSAR study of PPARa/g gene transactivation data using multivariate statistics). In addition, Dr. Saxena has also delivered a major talk entitled "Molecular modeling and docking studies on Hsp inhibitors" in the session II "Computer aided drug discovery".

Dr. Mohd. Imran Siddiqi was invited as a Visiting Scientist at International Centre for Science and High Technology, Trieste, Italy from 10 May - 09 July, 2009.

Mr. Vikas Verma, Project Assistant, Endocrinology Division has bagged the Best Poster Award in an International Congress on Bio-immunoregulatory Mechanisms Associated with Reproductive Organs: Relevance in Fertility and in Sexually Transmitted Infections held at National Institute of Immunology, New Delhi during 09-13 February, 2009 for his work on 'Functional attenuation of human sperm by promising non-surfactant spermicides through precise targeting of membrane physiology without affecting structure'.

Ms. Jyoti Pandey, Senior Research Fellow, Medicinal and Process Chemistry Division has received DST-DFG Award for participation in the Meeting of Nobel Laureates & Students held at Lindau, Germany during 28 June- 3 July 2009.

A view of the inagural function of Earth Day Celebrations 2009 at CDRI, Lucknow on April 22, 2009

DEPUTATION ABROAD

Name of Scientist	Place of Visit	Purpose of visit	Duration
Dr. Shailja Bhattacharya	Switzerland	To attend the joint Meeting of the Expert Drug Discovery Advisory Committee and Task Force on Helminth Drug Initiative	30 March-1 April, 2009.
Dr. D.K. Dikshit	France	To attend meeting of Consultative Committee for Amount of Substance: Metrology in Chemistry (CCQM) and its Working Groups	20-24 April, 2009
Dr. Ranjana Srivastava	USA	To attend Indo-US workshop on Discovery Research Programme on Rare/Orphan Disease	27-29 April, 2009
Dr. Vinita Chaturvedi	USA	To attend workshop for the BSL3 Biosafety officers in Albuquerque	27 April - 02 May, 2009
Dr. A.K. Tamrakar	Canada	BOYSCAST Fellowship, 2008-09 for conducting research/undergoing training in advance research techniques in area of *Diabetes mellitus* and insulin resistance at The Hospital for Sick Children, Toranto	27 April 2009 - 26 April, 2010
Dr. R.K. Tripathi	Thailand	To attend workshop on Design and Discovery of Drugs Against HIV, Dengue Fever and Avain Influenza	04-06 May, 2009
Mrs. Reetu Malik	UK	Exchange Programme under CSIR- Royal Society	02 May-02 August, 2009
Mr. Rahul K. Verma	UK	Exchange Programme under CSIR- Royal Society	02 May-02 August, 2009
Dr. N. Chattopadhyay	UK	To attend 8th European Congress on Menopause & Andropause	16-20 May, 2009
	Denmark	To take Ph.D. viva as external examiner and delivering a couple of lecture	25 June - 03 July, 2009
Dr. Mohd. Imran Siddiqi	Italy	Rational Drug Design and Development Sub-program, ICS,UNIDO	10 May-10 July, 2009
Dr. Amit Mishra	UK	To conduct experiments in the lab. of Prof. Peter York at IPI, UK	07 -13 June, 2009
Dr. Anil Kumar Saxena	Turkey	To participate in 5th International Symposium on Computational Methods in Toxicology and Pharmacology : Integrating Internet Resources	04 - 08 July, 2009
	Germany	To discuss about 2 new antithrombotic compounds with Prof. T. Hohlfeld in Dusseldorf, Germany	09 - 10 July, 2009
	South Africa	To attend the 5th International Congress on Pharmaceutical and Pharmacological Sciences (ICPPS-2009)	23-26 September, 2009
Dr. P.M.S. Chauhan	UK	To participate in 42nd IUPAC Congress, University of Glasgow	02 - 07 August, 2009
Dr. Rama Pati Tripathi	South Africa	To participate in the programmes on Advanced Design and Development of Potential Drug against Tuberculosis	03 - 05 August, 2009
Dr. Mohd. Imran Siddiqi	South Africa	To participate in the programmes on Advanced Design and Development of Potential Drug against Tuberculosis	03 - 05 August, 2009
Dr. Amir Nazir	Israel	To attend the 1st BIOmics workshop and conference	30 Aug - 04 September 2009
Dr. Rajender Singh	Israel	To attend the 1st BIOmics workshop and conference	30 Aug - 04 September 2009
Dr. Zaka Imam	Canada	To participate in the 6th International Congress on Peer Review and Biomedical Publication	10 -12 September 2009
Dr. S.K. Puri	Holland	For attending the proposed MMV convened Expert Scientific Advisory Committee Meeting	22-23 September, 2009
Dr. P.R. Mishra	Netherlands	To participate in the XVII International Conference on Bioencapsulation	24 - 26 September, 2009

STAFF NEWS

APPOINTMENTS/NEW JOINING

Sh. Ranveer Singh, Scientist Gr. IV(1) has joined CDRI on transfer from IIP, Dehradun against a post relieved from DG's quota for 6 months.

Sh. Tariq Qutubuddin, Senior Deputy Secretary (Project Monitoring) joined CDRI on transfer from IITR, Lucknow.

Sh. Ram Rishi Raman, Section Officer (F&A) joined CDRI on transfer from NEERI, Nagpur.

Sh. Ram Karan Harijan, Gr. III(3) has joined Instrumentation Division of CDRI on transfer from NML, Jamshedpur.

Sh. RA Prajapati, Gr. II(1) joined Laboratory Services Engineering Division on transfer from NML, Jamshedpur.

Smt. Hari Joshi, Gr. I(1), Pharmacology Division.

Sh. Suresh Kumar, Gr. I(1), Laboratory Engineering Services.

PROMOTIONS

Scientist Gr. IV(4) to Gr. IV(5)

Dr. (Mrs). Madhur Ray (Retd.)

Dr. Arvind Kumar Srivastava

Dr. Neeraj Sinha

Dr. YS Prabhakar

Dr. AK Shaw

Mr. Vinay Tripathi

Scientist Gr. IV(3) to Gr. IV(4)

Dr. PSR Murthy (Retd.)

Dr. (Mrs). NA Kaushal

Dr. SK Rath

Dr. Amit Misra

Mr. Amar Nath

Scientist Gr. IV(2) to Gr. IV(3)

Dr. Rajkamal Tripathi

Dr. TG Narender

Dr. KR Arya

Dr. PR Mishra

Scientist Gr. IV(1) to Gr. IV(2)

Dr. (Mrs.) YK Manju

Dr. Mohd. Sohail Akhtar

Dr. (Mrs.) Ritu Trivedi

Dr. Sudhir Kumar Singh

Mr. Sanjeev Kanojiya

TRANSFER

Sh. VL Nayak, Gr. III(1), Endocrinology Division transferred to IICT, Hyderabad.

Sh. I.B. Dikshit, Section Officer (F&A) transferred to CIMAP, Lucknow.

SUPERANNUATIONS

Dr. VK Bajpayee, Scientist Gr. IV(6)

Dr. DC Kaushal, Scientist Gr. IV(4)

Sh. AK Nigam, Gr. III(7)

Sh. SC Nigam, Gr. III(7)

Sh. Prakash Narain, Gr. III(7)

Sh. AP Singh, Gr. III(7)

Sh. MK Srivastava, Gr. III(5)

Sh. JR Gupta, Gr. II(4)

Sh. Baldev Singh, Gr. II(4)

Sh. Kishori Lal, Gr. II(4)

Sh. Om Prakash, Gr. I(4)

Sh. Ram Lal, Gr. I(4)

Sh. Garibe, Gr. I(4)

VOLUNTARY RETIREMENT

Sh. Hari Lal, Gr. I(4)

OBITUARY

Sh. GS Sonkar, Gr. I(4) expired on 22/06/2009

Smt. Geeta, Gr. I(2) expired on 15/08/2009

CDRI family convey their heartfelt condolences to the bereaved families

Dr. Sanjay Batra bagged the Most Cited Paper 2006-2009 Award of Tetrahedron

The Tetrahedron report entitled "Advances in the Baylis-Hillman reaction-assisted synthesis of cyclic frameworks" authored by Vijay Singh and Sanjay Batra published, in Tetrahedron, Volume 64, Issue 20 (2008), Pages 4511-4574, has received ***the Most Cited Paper 2006-2009 Award*** of **Tetrahedron**. The report is an assimilation of all synthetic applications of the Baylis-Hillman reaction resulting in the cyclic compounds from the year 2003 to early 2008.

Dr. Batra's research group has extensively contributed to the development of chemistry of the Baylis-Hillman reaction, which comprises of a tertiary amine-catalyzed C-C bond-formation between aldehyde and activated alkene. His work has not only unfolded several fast reacting electrophiles for this otherwise sluggish reaction but has also provided insights into the mechanistic details on the formation of different products during the course of this reaction.

Announcement
4th International Symposium on
Current Trends in Drug Discovery Research
(CTDDR-2010)

Central Drug Research Institute, Lucknow is organising 4th International symposium entitled "Current Trends in Drug Discovery Research" (CTDDR-2010) during 17-21st February, 2010. It will be in the spirit of the symposiums organized earlier in this institute and will focus on the innovative drug discovery approaches for infectious & tropical diseases (malaria, filaria, leishmania, HIV, tuberculosis), aging, genetic, metabolic & endocrine disorders (neurodegenerative, diabetes, obesity, CNS & CVS related disorders, osteoporosis) and cancer. The deliberations shall contain the cocktail of computational endeavours, innovative drug discovery approaches and in-depth analysis of structure-activity relationships (SAR), new drug targets and state of art techniques for the syntheses of organic molecules. Preliminary classifications of sub-areas for discussions are as follows:

- Cellular and Molecular Signalling.
- Virtual Library Design and Screening.
- Systems Biology.
- Drugs from Nature/Bio-prospecting.
- Molecular Approaches to Disease Therapy.
- Validated Therapeutic Targets.
- Novel Approaches to Drug Discovery.
- Drug Design, Synthesis, QSAR, CADD & CAMM.
- Pharmacokinetics/Pharmaceutical Sciences.
- Translational Research.
- Informatics in Drug Discovery.
- Preclinical/Clinical Trials.
- Ethics, Regulation & Governance.

The planned symposium CTDDR-2010 will be of immense value to the entire community engaged in chemical/pharmaceutical/biological sciences including drug discovery research. It will provide opportunities for young colleagues/students to interact with the eminent experts from all over world.

*Dr. A.K. Saxena, Scientist G & Head, Medicinal & Process Chemistry Division (Phone: 91(0522)2624273, Mobile:09839012951, E-mail:**anilsak@gmail.com, ak_saxena@cdri.res.in**) is the Organising Secretary of the Symposium and he may be contacted for further details. For more information and registration, please visit symposium website **www.ctddr.com***

Editorial Board: ***Patron***: Dr. TK Chakraborty; ***Managing Editor***: Dr. Zaka Imam; ***Editor***: Dr. AK Goel; ***Associate Editor***: Dr. Anand P. Kulkarni;
Editorial Committee: Dr. SB Katti, Dr. N. Chattopadhyay, Dr. C. Nath, Mr. Vinay Tripathi, Dr. Sanjay Batra, Mr. Ali Kausar, Mr. NA Siddiqui, Mr. BD Vashisth and Dr. VN Tiwari.

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