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CSIR NEWS

Progress, Promise and Prospects

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C O N T E N T S

NEIST Signed MoU with ARDA, Thailand



New National Facility Created at IICT



CBRI Celebrates the Foundation Day



Golden Jubilee Lecture Series held at NEIST



Dr. Ashwani Kumar, Hon'ble Minister of State for Planning, Parliamentary Affairs, S&T, and Earth Sciences visits NAL and NIO



website: <http://www.csir.res.in>



Peptides for Treating Cancer

A team of scientists at the National Chemical Laboratory (NCL), Pune led by Dr. M. I. Khan has isolated a novel peptide that could play an important role in treating or preventing cancer. The peptide, called 'cysteine protease inhibitor' isolated from *Streptomyces* has been shown to inhibit the migration of cancer cells. Actually the enzyme, 'cysteine protease' plays a significant role in various pathological conditions such as cancer metastasis, osteoporosis etc. Therefore, compounds having inhibitory activity against cysteine protease have been shown to work as drugs in these pathological conditions.

Microbes and plants have been the most efficient and convenient source of natural bioactive compounds. Novel secondary metabolites continue to be isolated from *Actinomycetes*. Their biological activities and chemical structures show a wide range of diversity. Taking into consideration all this understanding, the *Actinomycetes* were explored in order to isolate cysteine protease inhibitor of small molecular mass.

During the course of investigation, a novel peptide (736-842 Da) was isolated which has Cathepsin K and L inhibition activity in nanomolar range. Cysteine proteases play an important role in cell migration and tumour metastasis. The compounds which possess their inhibition without harming the healthy tissues are of great significance, having potential to be developed as effective anti-metastatic drugs for tumour therapy. A small molecule of cysteine

protease inhibitor, CPI-2081 (Compound 1), comprising a mixture of two novel penta-peptides, compound 1a and compound 1b, was isolated from *Streptomyces* species: NCIM2081. It was found that compound 1 significantly inhibits tumour cell migration.

The effect of CPI-2081 was also investigated on osteoclast differentiation. The results suggest that CPI inhibits osteoclast differentiation without any toxic effect on osteoclast precursors. A novel modified peptidic thiol protease inhibitor (CPI-2081) was isolated from *Actinomycete* (*Streptomyces sp* NCIM2081) which exhibit K_i in nanomolar (<100 nm) range and it can inhibit the tumour cell migration without any cytotoxic activity. Also, the CPI is able to inhibit the RANKEL induced osteoclast differentiation without having considerable cytotoxic effect. Among all kinds of sources for natural bioactive compounds; *Actinomycetes* always had a competitive edge over others with respect to their ability to produce bioactive small molecules for drug development.

The NCL scientists determined the inhibitory constant (K_i), which is an important parameter that shows the potency of inhibitory compounds. It is the concentration required to produce half maximum inhibition. The initial kinetics of substrate hydrolysis inhibition by Compound 1 revealed that substrate hydrolysis decreased as a function of concentration of Compound 1 in a dose-dependent manner displaying the IC_{50} value of 36.9 ± 1.8 nM. Dixon plot

demonstrated the competitive mode of association of compound 1 with papain, showing K_i value of 49.14 ± 2.45 nM, which is close to IC_{50} value.

The peptide needs to be chemically synthesized and evaluated for its anti-metastatic and anti-osteoporotic activities. It also needs to be evaluated in other pathological conditions where cysteine proteases are known to be involved. This low molecular weight peptide inhibitor has the potential to be developed as a significant drug molecule. However, most of such inhibitors have several disadvantages like cytotoxicity, allergic reactions, low absorptivity etc.

Commenting on the work, Prof. Alexei Degterev from the Department of Biochemistry, Tufts University School of Medicine, Boston said that "Efficient inhibition of cysteine proteases remains an important goal of medicinal chemistry. Multiple cathepsins as well as other cyteine proteases are important targets in drug discovery against cancer and other diseases. Analyses of *Actinomycetes* products have historically provided an excellent source of diverse biologically active molecules.

Dr Khan's group at NCL has used this approach to discover a new inhibitor of cysteine proteases in *Streptomyces* fermentation broth. They have shown an in-depth characterization of the main inhibitory substance, peptide Compound 1. Using papain as a reference enzyme, they demonstrated nanomolar inhibition by Compound 1. Furthermore, they went on to show inhibition of migration



of three different aggressive tumor cell lines by this molecule. No doubt, this work reveals a new class of potential inhibitors of cancer metastasis.

Prof Alexei further said that, “It would be very interesting to learn in the future the cellular targets of this molecule in cancer cells and the activity of this molecule in mouse metastasis models. Another promising direction may be the development of peptidomimetic analogs of Compound 1 to improve pharmacological properties

of this molecule *in vivo*, including cell permeability and stability. These molecules could turn out to be promising new anti-cancer agents, inhibiting cancer metastasis without significant dose-limiting toxicity.”

The work was carried out in collaboration with National Centre for Cell Science, Pune.

For further reading: Structure, and Functional Elucidation of a Modified Pentapeptide, Cysteine Protease Inhibitor (CPI-2081) from *Streptomyces* Species 2081

that Exhibit Inhibitory Effect on Cancer Cell Migration, Jay Prakash Singh, Sudarsan Tamang, P. R. Rajamohanam, N. C. Jima, Goutam Chakraborty, Gopal C. Kundu, Sushma M. Gaikwad, and Mohamad I. Khan, *J Medicinal Chemistry*, 2010, 53, 5121-5128.

(Dr. M.I. Khan died prematurely in November 2010 at the age of 53. Dr Khan joined NCL in May 1990. He contributed significantly to the area of Protein Chemistry, Glycobiology, Enzymology and Biophysics and published over 120 research papers in the international peer-reviewed research journals.)

R&D Highlights at NIO, Goa

Examining Micrometeorites Collected from Indian Ocean

A total of 378 micrometeorites collected from deep-sea sediments of the Indian Ocean were examined by CSIR scientists, of which 175, 180, and 23 are I-type, S-type, and G-type respectively. Of the 175 I-type spherules, 13 contained platinum group element nuggets (PGNs). The nuggets occur in two distinct sizes and have distinctly different elemental compositions: micrometer-sized nuggets that are >3 μm contain dominantly Ir, Os, and Ru (iridium-platinum group element or IPGE) and sub- μm (or nanometer)-sized (< 1 μm) nuggets, which contain dominantly Pt, Rh, and Pd (palladium-PGE or PPGE).

The μm -sized nuggets are found only one per spherule in the cross section observed and are usually found at the edge of the spherule. By contrast, there

are hundreds of nanometer-sized nuggets distributed dominantly in the magnetite phases of the spherules, and rarely in the wustite phases. Both the nugget types are found as separate entities in the same spherule and apparently, nugget formation is a common phenomenon among I-type micrometeorites. However, the μm -sized nuggets are seen in fewer specimens (approx. 2.5% of the observed I-type spherules). In all, four nuggets of 1 μm size and 213 nanometer-sized nuggets from 13 I-type spherules were analyzed for platinum group elements.

Chemically, the μm -sized PGNs contain chondritic ratios of Os/ Ir, but are depleted in the more volatile PGE (Pt, Rh, and Pd) relative to chondritic ratios. On the other hand, the

nanometer-sized nuggets contain dominantly Pt and Rh. Importantly, the refractory PGEs are conspicuous by their absence in these nanometer nuggets. Palladium, the most volatile PGE is highly depleted (< 1.1%) with respect to chondritic ratios in the μm -sized PGNs, and is observed in only 17 of 213 nanometer nuggets with concentrations that are just above the detection limit (greater than or equal to 0.2%).

Distinct fractionation of the PGE into IPGE (Ir, Os, Ru) and PPGE seems to take place during the short span of atmospheric entry. These observations suggest several implications: (1) The observation of fractionated PGE in an Fe-Ni system gives rise to the possibility that Earth's core could contain fractionated PGE; (2) The present data



support the processes suggested for the fractionated PGE patterns observed in the ejecta of ancient meteorite impacts; (3) Meteoric metals released in the troposphere could contain fractionated

PGNs in large numbers.

Authors: . Rudraswami, N.G. Parashar, K. ShyamPrasad, M.

Citation: Meteoritics & Planetary Science, vol.46(3); 2011; 470-491

Publisher: The Meteoritical Society

Copyright: An edited version of this paper was published by Blackwell. Copyright [2011] The Meteoritical Society.

URI: <http://drs.nio.org/drs/handle/2264/3825>.

Profiling of Immune Responsive Genes Expressed in Post-Larvae of *Fenneropenaeus indicus* Challenged with *Vibrio harveyi* D3

CSIR scientists have identified 38 genes and eight hypothetical proteins by sequencing of 1200 clones from a *Vibrio harveyi* challenged *Fenneropenaeus indicus* subtracted cDNA library. Based on physiological roles and functions, these genes were categorized into 10 groups with about 29% of the sequences having no matches in the databases.

Immune related transcripts in the library were carboxypeptidase B, ferritin, translationally controlled tumor proteins (TCTP), hemocyanin, chitinase and serine carboxy peptidase. Remarkably, qPCR results imply 4.15, 3.45 and 1.86-fold rises in expression of ferritin, TCTP and hemocyanin transcripts respectively. Additionally, minor upregulation of other immune relevant

genes: lectin, penaeidin, crustin, MnSOD was observed in the challenged post-larvae.

Authors: Nayak, S.; Ajay, K.M.; Ramaiah, N.; Meena, R.M.; Sreepada, R.A.

Citation: *Journal of Invertebrate Pathology*, Vol.107 (2); 2011; 168-172

Publisher: Elsevier

URI: <http://drs.nio.org/drs/handle/2264/3860>

Synthesis of Mono and Dinuclear Arene Ruthenium(II)Triazoles by 1,3-Dipolar Cycloadditions to a Coordinated Azide in Ruthenium(II) Compounds

The dimeric Eta sup(6) hexamethylbenzene ruthenium(II) triazole compounds of formulation (((Eta sup(6)-C sub(6)Me sub(6))Ru(N sub(3)C sub(2)(CO sub(2)R)sub(2))sub(2) - (mu C sub(2)O sub(4))) have been synthesized by 1,3-dipolar cycloadditions of coordinated azido compound ((Eta sup(6)-C sub(6)Me sub(6))Ru(L sub(1))N sub(3)) (1) with substituted acetylene, RO sub(2)CC sub(2)CO sub(2)R via unexpected oxidation of the coordinated ligand to oxalate (where; L sub(1)= 5-hydroxy-

2-(hydroxymethyl)-4-pyrone; R = Me, 3 or Et, 4).

In contrast, a similar 1,3-dipolar cycloaddition reaction of (((Eta sup(6)-C sub(6)Me sub(6))Ru(L sub(2))N sub(3))) (2) (where; L sub(2) = tropolone) with acetylene yielded the monomeric triazole compound ((Eta sup(6)-C sub(6)Me sub(6))Ru(L sub(2)){N sub(3)C sub(2)(CO sub(2)R)sub(2)})) (where; R = Me, 5; Et, 6). The compounds were characterized by spectroscopy and the structures of representative compounds 4 and 6 have

been determined by single crystal X-ray diffraction. The two ruthenium centres in the compound 4, are linked by a tetradentate oxalate group. Both compounds, 4 and 6, crystallized in a triclinic space group P-1.

Authors: Singh, K.S.; Svitlyk, V.; Mozharivskyj, Y.

Citation: *Dalton Transactions*, Vol.40 (5); 2011; 1020-1023

Copyright: An edited version of this paper was published by The Royal Society of Chemistry 2011. <http://dx.doi.org/10.1039/C0DT00698J>

URI: <http://drs.nio.org/drs/handle/2264/3789>



Decoding One's Ultimate Identity – CSIR's Pioneering Efforts in DNA Profiling

Dr. P. Cheena Chawla

Secretly hidden in the master molecule of life – the deoxyribose nucleic acid (DNA) – lies the ultimate identity card of every biological specimen. This wonderful molecule constitutes the 'blueprint' of life by which traits are passed on from one generation to another. It is the coded message in the DNA molecule that differentiates every living species from any other. This coded genetic information present in every cell of the body of a life form can be profiled employing a sophisticated technology that facilitates the identification of that organism at genetic level.

Popularly called DNA fingerprinting, this technology is more appropriately named as DNA profiling. As the DNA fingerprint is a unique molecular signature of a person, it cannot be altered in his/her lifetime, which means it differs for each of the 6.5 billion human beings on Earth, with one exception — identical twins. This technology took root in India in 1988 by the pioneering efforts of Dr Lalji Singh, former Director, Centre for Cellular and Molecular Biology (CCMB), Hyderabad.

Basically, Dr. Lalji Singh and his team developed a DNA probe called Bkm-derived probe, derived from an Indian banded krait snake, that has been immensely useful in several applications of DNA profiling like solving cases of paternity disputes, identification of missing children, identification of mutilated bodies, exchange of babies in

maternity wards, cases of rape and murder, and so on.

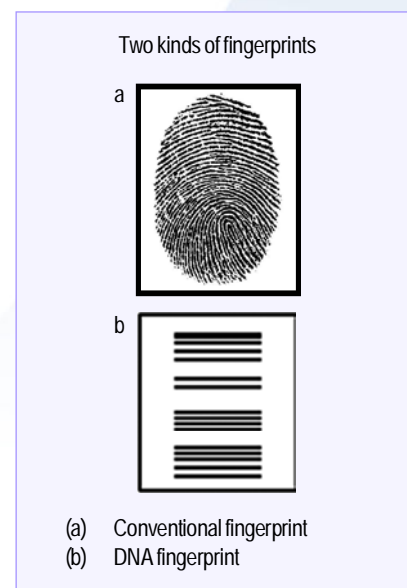
The wondrous role of this technology in revealing unerringly the identity of any organism thus prompted the Department of Biotechnology (DBT), Govt. of India to lay the foundation of 'Centre for DNA Fingerprinting and Diagnostics (CDFD)' in 1995. The aim of CDFD is to develop, acquire and standardize the protocols for carrier detection, prenatal diagnosis and genetic counseling for all genetic disorders prevalent in the country.

Now, what is the basis of DNA profiling technology? To begin, it is important to know that about 99% of the base sequence of DNA molecule is the same in all human beings. Only short stretches of highly variable segments differ from person to person. By DNA profiling, the variable DNA segments, about 10-15 base pairs long can be precisely hunted. The visual record of this exercise comprises the profile or 'fingerprint' of the genetic information that is unique to a person. To make a DNA profile some body tissue of that organism is required like a piece of hair with its root, a blood stain, few drops of semen, skin cells, a mouth swab, cells of the bone marrow or any other tissue.



Dr Lalji Singh rightly earns the credit for making DNA profiling technology popular in India

The foundation of DNA profiling technology was laid in 1984 by a British geneticist, Alec Jeffreys at the University of Leicester, U.K. Interestingly, while studying the myoglobin gene, Alec Jeffreys found that many stretches of this gene were non-coding and comprised highly repetitive sequences of DNA – a sort of a genetic stammer. Jeffreys isolated these variable number of tandem repeats (VNTRs) and labelled them with a radioactive chemical. In essence, the first 'probe' or detective DNA was born. As the two strands of DNA are complementary, Jeffreys developed methods by which binding of this probe





with its complementary region on myoglobin gene could be translated into a visual record on an X-ray film. This picture having a barcode appearance is actually individual-specific. VNTRs or repetitive DNA sequences were found to occur not just in the myoglobin gene but at several sites in the entire genetic material.

What differs from person to person is the length of the repeat sequence, the number of times it is repeated and its location in the long DNA chain. The DNA from a biological sample is first extracted and cut with special molecular scissors called restriction endonuclease, which recognize only a particular base sequence. This turns a long DNA fragment into several randomly sized pieces of DNA just like the varying lengths of noodles present in a soup. The VNTRs that are useful for forensic analysis are those which happen to be flanked by pairs of sites recognized and cleaved by a specific restriction enzyme. As the length of VNTRs varies in different persons, the size of various cut fragments is also different. So technically, DNA profiling is called RFLP (Restriction Fragment length Polymorphism) testing.

The cut DNA fragments are size-sorted using a technique called 'Gel Electrophoresis'. A slab of agarose with small wells is prepared and the

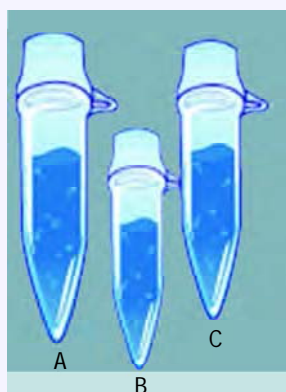
mixture of variously sized DNA fragments is gently placed in these wells. When electric charge is applied across the gel, the DNA fragments migrate from cathode to anode at speeds dependent on their respective sizes. As smaller DNA fragments move faster than the large ones, separation of these fragments on the gel results in a DNA smear.

To detect the variable repeat segments huddled within the DNA smear, a special technique called 'Southern Blotting' is now applied whereby the size-sorted DNA fragments are transferred from the gel to a special blotting membrane called

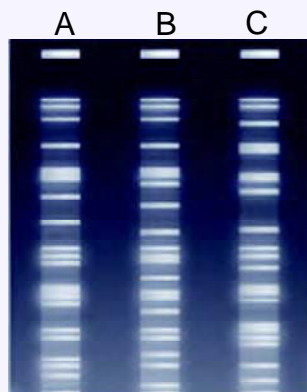
nitrocellulose filter. Nitrocellulose filter traps DNA just as blotting paper soaks ink. Before blotting, the helical zip of the double stranded DNA in the gel is opened out by a mild alkaline solution. Thus a perfect replica of DNA smear is obtained on the nitrocellulose filter.

The permanently bound DNA fragments on the filter are, however, not visible. A detective, *par excellence*, a DNA probe may have 10 to thousands of nucleotides, which are complementary to a highly variable repeat sequence, and to this a radioactive chemical is tagged that acts like a torch. The DNA probe is made single stranded by heat treatment prior to hybridization

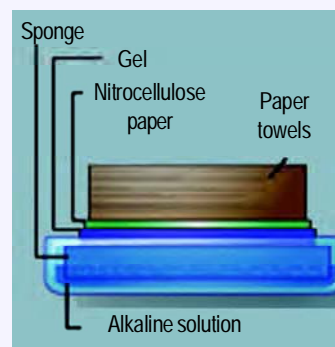
Making of a DNA Profile



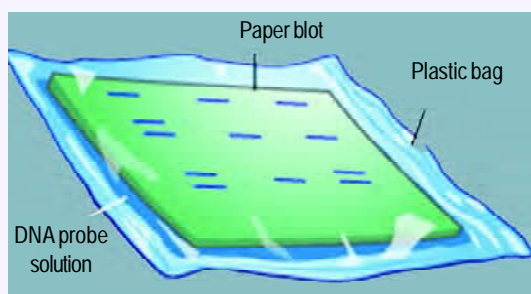
1. DNA from body samples is extracted and cut with restriction enzymes



2. Electrophoresis separates the restriction fragments into characteristic pattern of bands



3. By Southern blotting technique, the size-sorted DNA fragments are transferred from gel to nitrocellulose filter



4. Nitrocellulose filter is exposed to a solution containing radioactively-labeled probe



5. A photographic film is exposed to radioactivity in the bond probe. DNA profile is obtained on developing this film



with its complementary strands immobilized on the nitrocellulose filter.

There are two types of DNA probes: single-locus and multi-locus probes. The single-locus probes bind to such VNTRs, which occur at only one locus or site in the total genetic material. The DNA profile obtained using such probes consist of only two bands as every person has two copies of a particular VNTR — one from the father and the other from the mother. They are mostly used for identifying a mixture of biological samples.

Multi-locus probes, on the other hand, bind to repetitive regions that occur at thousand of sites in the total human DNA. The DNA profile obtained has 20 or more bands. Multi-locus probes are crucial for paternity testing as comparing several bands of two persons gives foolproof evidence if they are related.

After hybridization of radiolabelled probe with complementary strands on nitrocellulose filter, the latter is pressed against an X-ray film and left undisturbed at -70 °C for some time. On developing the X-ray film, an autoradiograph is obtained that shows the DNA profile of a person.

For establishing genetic differences between two unrelated individuals, scientists basically look at more than three million differences in their genes. These variations at the level of single nucleotides are referred as single nucleotide polymorphism (SNP). In a landmark study, for ascertaining genetic variability across various human populations in India, scientists analyzed about 5.6 lakh genetic markers across the genomes of 132 individuals who were selected from 25 diverse groups in India

that represented 13 States comprising all six language families, traditionally upper and lower castes as well as tribal groups. An important revelation of this study was that different Indian groups carry genomic material from two distinct ancestral populations – the Ancestral North Indians (ANI) and the Ancestral South Indians (ASI) (*CSIR News, Vol. 60, No. 1 & 2, January 2010, Genetic Diversity in Indian Populations – A New Door Opened, Pgs. 2-6*).

Interestingly, Dr Lalji Singh and his group have undertaken the study on genetic diversity in primitive tribes of India including the tribal populations of Andaman and Nicobar islands using Y-chromosomal markers and mitochondrial DNA sequences. Data indicates that the Andamanese have closer affinities to Asian than to African population and suggests that they are the descendants of the early Paleolithic colonizers of Southeast Asia.

DNA profiling technology has immensely helped in disease diagnosis as well. Genetic disorders like sickle cell anemia, thalassemia, Huntington's chorea etc., can be detected by this technology that has improved our understanding of the role played by genes in these diseases. Besides, kits for detecting infectious diseases like tuberculosis have also been developed as the unique molecular signature of the infecting bug can be detected based on this technology.

The pioneers of DNA profiling technology in India, CSIR scientists led by Dr Lalji Singh, have employed this technology for wild life preservation and better management of endangered species and also for identification and isolation of genes for useful characters

in silkworm races. Dr Singh and his team have employed this technology to identify pure Asiatic lions from the hybrids. Similar analysis of hair samples has enabled scientists to identify hybrids of Indian and Siberian tigers. Studies of Asiatic lions and tigers have further helped in identifying animals with high genetic variability, which is useful for conservation breeding programmes.

CSIR took a lead in the conservation of endangered wildlife as CCMB, Hyderabad, initiated in 1998 the setting up of the laboratory for Conservation of Endangered Species (LaCONES) in Hyderabad with help of the Department of Biotechnology (DBT), Govt. of India, New Delhi and the Central Zoo Authority (CZA), New Delhi. The Department of Forestry, Government of Andhra Pradesh and the Nehru Zoological Park at Hyderabad, were also major partners in this joint venture (*CSIR News, Vol. 60, No. 17 & 18, September 2010, LaCONES—CSIR's Efforts to Nurture Nature, Pgs. 195-196*).

Undoubtedly, the versatile technology of DNA profiling today finds multifarious uses in a wide range of applications. Hats off to CSIR scientists for making this technology touch our lives in multiple ways.

(A popular science book on DNA fingerprinting, entitled, *Detective DNA* is published by National Institute of Science Communication & Information Resources (CSIR), New Delhi. For placing purchase orders for this book you may contact: **The Senior Sales & Distribution Officer, NISCAIR, Dr K. S. Krishnan Marg, New Delhi-110012**; Price: Rs.40/-. Website for online orders: www.niscair.res.in)



NEIST Signed MoU with ARDA, Thailand

The North East Institute of Science & Technology (NEIST), Jorhat, signed a bilateral MoU with Agricultural Research & Development Agency (ARDA), Thailand, at a special Function held on 23 June 2011, in M. S. Iyengar Conference Hall of its premises. An eleven member delegation from ARDA, Thailand led by its Director, Dr Napavarn Noparatnaraporn paid official visit to NEIST during 21-24 June 2011.

The basic objective for scientific cooperation between the Institutes of the two countries includes: (i) both ARDA and NEIST will as far as practicable, exchange research information and experienced researchers with a view to mutually promote research in Science & Technology and related activities between the two countries; (ii) both the institutions will cooperate with each other to jointly organize academic seminars and symposiums to promote research; (iii) both the institutions will encourage personnel to interact to strengthen the working relationships; (iv) both the institutions will work together to promote projects of shared interest; (v) both the institutions will reciprocally facilitate science based innovation and fact findings resulting into business development activities and so on.

In the beginning of the Function, the members of Thai delegation were felicitated with traditional Assamese *gamocha* and flower bouquet which was followed by Welcome Address by Dr R. C. Boruah, Scientist, NEIST.



Dr Napavarn Noparatnaraporn (left), Director, ARDA, Thailand and Dr P. G. Rao (right), Director, NEIST at the MoU signing ceremony

Dr Boruah in his address gave a brief overview of NEIST and its various activities and the achievements made by the Institute over its glorious 50 years of existence and also mentioned that the MoU signing will definitely add an extra significance to the on-going Golden Jubilee celebrations of the Institute.

This Function for MoU signing was attended by Dr P. Kapur, Director, CSIO, Chandigarh, Dr M. Hazarika, Director, Tea Research Association, Tocklai, Jorhat, Dr N K. Vasu, Director, Rain Forest Research Institute, Jorhat as special invitees, members of Press and Media, senior scientists and other officials of NEIST, besides the Thai delegation and Director duo of the MoU

signing Institutes. After mutual acquaintances of the members present, Dr P. G. Rao, Director, NEIST, spoke on the background of the subject and the purpose for which the MoU was being signed. He informed the gathering that this maiden beginning will further lead to detailed specific areas of cooperation to which the Thai counterpart also added from their side.

The MoU was then formally signed by Dr P. G. Rao on behalf of NEIST, Jorhat and by Dr Noparatnaraporn on behalf of

ARDA. The signed documents were then mutually exchanged between the Directors of the two sides. After the signing, there was a brief discussion among the members present about the strategies of cooperation and the areas to be covered under the Treaty. The Directors trio of the CSIO, Chandigarh, TRA and RFRI, Jorhat profusely appreciated the signing of MoU by NEIST and ARDA and lauded the good work and leadership demonstrated by the NEIST Director, Dr P. G. Rao. The Function concluded with Vote of Thanks by Shri B.C. Saikia, Scientist & Head, Information & Business Development Division, NEIST.

CLRI Signs Agreement with Industry

CLRI signed an agreement with M/s. Running Bull Leathers Private Limited, SIPCOT Industrial Growth Centre, Perundurai on 15 March 2011 in connection with the preparation of Prefeasibility Report relating to erecting Bio-gas plant



New National Facility Created

DST-CSIR Sponsored National MolBank (NMB) Facility at IICT

Drug discovery, which has benefitted mankind enormously over the last 100 years, is a complex, interdisciplinary quest of mainly chemistry, pharmacology and clinical sciences. Natural products based scaffolds have played an important role in drug discovery programmes of modern pharmaceutical companies worldwide and still continue to be the mainstay for providing new leads. However, there is a pressing need to develop new chemical entities (NCEs) as leads from natural resources alone are not proving sufficient to cater to the demands of the pharmaceutical industry.

Pharmaceutical industry is and will always be in search for new bioactive molecules and pharmacophores for use as drugs. The chemical diversity provided by natural products is very unique and is unmatched by synthetic chemicals. The need of the hour is to develop compound libraries which are

biologically relevant and yield high hit and lead rates. These facts gave an impetus to the idea of setting up a facility where a large number of samples will be stored simultaneously and later on, subjected to biological screening.

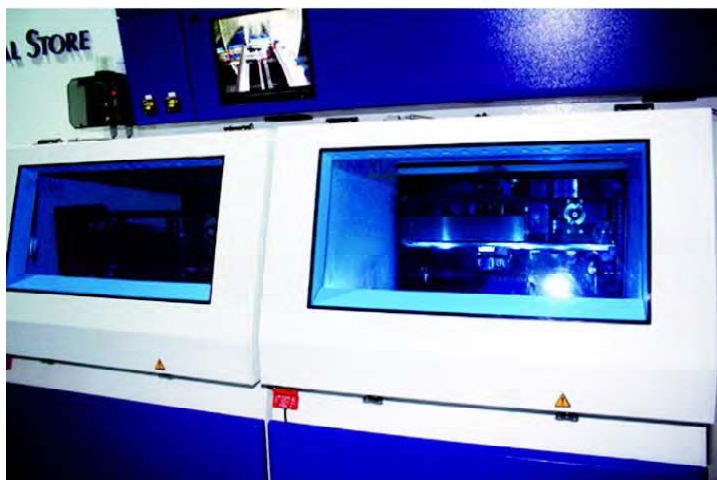
The NMB (National MolBank), a unique facility, created at IICT and funded by DST and CSIR will address the ever-evolving requirements of sample management for a broad range of applications including pharmaceutical, biotechnology, agrochemical and speciality chemicals. The equipment provided by NEXUS, USA is also known as universal store. All actions from storage to retrieval are controlled by software commands using robotics. A total of 1.6 million samples can be stored in this facility, of which majority have been either isolated or synthesized in the Institute(s) while a few will be procured from outside.

The main criteria for selecting the

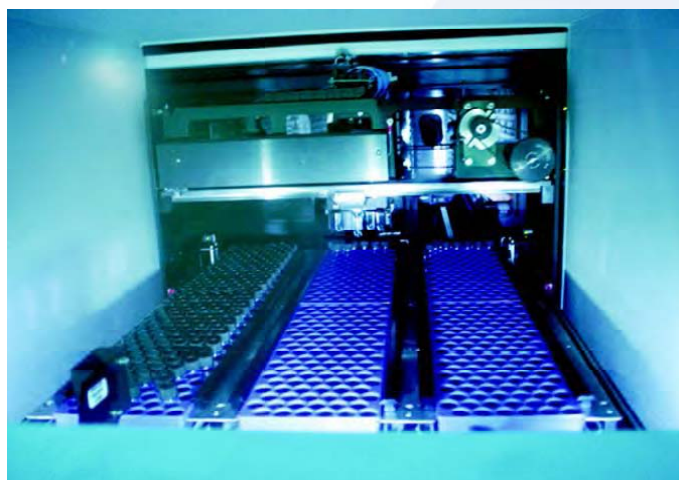
samples for storage will be their diversity. The samples can be stored in glass vials and plastic tubes making it convenient to store samples both in solid and liquid state. The NMB works on three tiers of bar-coding reducing the chances of error. The compounds are stored at $-20\text{ }^{\circ}\text{C}$ and environmental controls are provided to precisely maintain a stable and inert storage atmosphere (under Nitrogen).

This ensures long-term sample integrity which is critical for high quality and reproducibility in screening. While retrieval, freeze thaw cycles are dramatically reduced as cherry picking is done within the sample storage environment. Operations such as defrosting, ID scanning, sample picking, and plate manipulation are all performed in separate Workstation Modules.

The samples are stored in 2D bar-coded vials/tubes which in turn are stacked in trays and arrays. The glass



Front view of the store for sample visibility



Robotic sample storage system



vials are of 2 mL capacity and can store up to 2g of sample (depending on the nature of the compound) and the plastic tubes are of 400 μ L capacity which will be mainly used for storing daughter and grand daughter solutions. The standard daughter solution would be 1mM and will be diluted into grand daughter solutions as per the requirements. The solvent used will be DMSO and in rare cases ethanol. Depending on the dimensions of tubes and vials there are different racks (arrays) and trays. These are:

1. **Standard density tray** - This is only for tubes, is orange in colour with 1D barcode. It has positions to keep six racks with 1D barcodes and each rack has 96 positions to store the tubes. Thus, the overall capacity is of storing 576 tubes.
2. **High density tray** - These are also used for tubes only, is blue in colour with 1D barcode and it is integrated high-density array capable of storing 952 tubes.
3. **Vial tray** - These trays, specific for vials only, are gray in colour with 1D barcode. It can store 2 racks (arrays) which are blue in colour with 1D barcode. Each rack can hold 120 vials thus one tray can hold 240 vials.

Inside NMB, there is carousel with 14 carriers and each carrier has 342 shelves for storing the samples. The inner space of NMB is nearly 43 m³. The inside temperature is maintained at -20 °C by use of compressors and oxygen is maintained at 2.5% with humidity at 0.5g/ m³. There are different workstation modules that perform input, output, thawing and sample picking. They are:

1. Tube selector to pick required tubes from source tray to destination tray.
2. Vial selector to pick required vials from source tray to destination tray.
3. IO module is the place where we can input and output the trays.
4. Control box provides specified power supply to all devices which are attached to universal store and has a display monitor to observe the inside operations visually.

The entire functioning of the NMB is controlled through computers. The process of storing samples in NMB has started and over 5000 compounds would be stored. The DG- CSIR Prof. Samir K. Brahmachari has taken great interest in this Project and has instructed the Open Source Drug Discovery (OSDD) Programme Manager to share all the 10,000 samples available with the programme, to be stored in NMB. It is also expected that over 5000-8000 samples per year, from within CSIR and universities, will pour into NMB. The NMB is gearing up to supply 1mM, 200 mL of DMSO solution, 96 wellplates to do HTS to collaborating biology laboratories.

For further information, please contact Director, IICT at yadav@iict.res.in.

Acoustic Tests on Two Major ISRO Satellites at ATF-NAL

Acoustic tests on two major ISRO satellites, the GSAT-8 and the GSAT-12 were successfully completed at the Acoustic Test Facility at NAL during March and May 2011. Both the satellites are to be launched into geostationary orbits and carry communication payloads. The GSAT-8 is a high power Ku band satellite, with a lift off mass of 3,100 kg and was launched successfully by the Ariane-5 launcher of the European Space Agency on 21 May 2011. The GSAT-12 is a smaller satellite operating in the Extended C-band with a lift off mass of 1,400 kg.

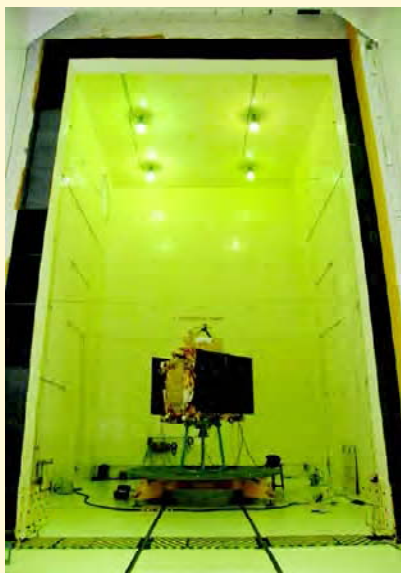
The GSAT-8 was subjected to an overall sound pressure level of 142.5 dB in the 1100 m³ reverberation chamber of ATF. The



GSAT-8 Satellite during acoustic test at ATF



NEIST organized Workshop on *Faculty Training & Motivation Programme*



GSAT-12 Satellite inside the 1100 cu. m reverberation chamber of ATF

satellite was extensively instrumented for measurement of acceleration and strain at 70 critical locations. Data from all these locations was acquired during the 60 second acoustic test and analyzed. The satellite was 'live' during the acoustic test with all payloads being powered by internal batteries. Health of the satellite was monitored during the acoustic test through telemetry.

Acoustic tests on the GSAT-12 satellite were carried out at ATF during May 2011. The satellite was subjected to an overall sound pressure level of 147 dB. The satellite was instrumented similarly as in the GSAT-8 and all parameters monitored. Both the satellites successfully withstood the acoustic environments they were subjected to. The acoustic test facility was able to generate the specified acoustic levels within tolerances and carried out both the tests successfully.



Dr P. G. Rao, Director, NEIST, welcoming the participants

North East Institute of Science & Technology (NEIST), Jorhat organized a two-day workshop under CSIR scheme of *Faculty Training and Motivation and Adoption of Schools and Colleges by CSIR Labs* during 29-30 March 2011 at its premises. The Workshop started with a short Inaugural Function on 29 March 2011 presided over by Dr. P. G. Rao, Director, NEIST. Altogether 25 students and three faculty members from Bahona College, Jorhat and Kendriya Vidyalaya, NEIST attended the Workshop.

Welcoming the participants, Dr Rao mentioned that the Workshop is organized by all CSIR laboratories across the country with the basic objective to expose the students as well as the faculty members to the latest developments in Science and widen their horizon to achieve a better understanding of science subjects. Dr. L. Nath, Scientist F & Programme

Coordinator gave a brief introduction of the Workshop to the students and faculty present. He particularly mentioned that the scheme was the visionary idea of Dr. R. A. Mashelkar, former DG-CSIR to combat the steady declining rate of students opting for Science as their career.

Important aspects of the Workshop included popular lectures by NEIST Scientists namely Dr. P. R. Bhattacharyya, Dr. T. C Bora, Dr. Saurabh Baruah and Dr. M. J. Bordoloi, Scientist who spoke on, *Honeybee and Crop Pollination*, *Biodiversity in North-East Gene Pool*, *Earthquake Source Process and a Case Study* and *Chemistry is Everywhere* respectively, visit to the different divisions of NEIST and face-to-face interaction with scientists.

The Workshop came to an end with a short Valedictory Function held on 30 March 2011 where Dr. B. G. Unni,



Scientist G & Area Coordinator-Biological Sciences, NEIST presided over the Function. In the Function, the participating students as well as teachers gave their feedback and highly appreciated the efforts of NEIST and

the apex body, CSIR for giving them the opportunity to be a part of such a valuable Workshop. Dr. Unni in his speech said that the main objective of holding the Valedictory Function was to know what the participants especially

the students learnt from the Workshop. He appreciated the students for their active participation and giving feedback and suggestions. The Function ended with a Vote of Thanks offered by Ms. Kuin Barua, Technical Officer, NEIST.

NEIST Conducted *Science Motivation Programme* for School Students

With an objective to attract and motivate students towards the area of basic science for career building, NEIST, Jorhat, conducted a week-long motivational programme for talented students of North-East region during 21-26 March 2011. The Programme was formally inaugurated on 21 March 2011 where Dr. R. C. Boruah, Scientist-in-charge, NEIST, presided over the Function.

Welcoming the participants, Dr. R. C. Boruah cited the various opportunities and benefits that the students can obtain from the Programme and urged upon them to take full advantage of it. Dr. P. C. Neog, Scientist F and Principal Coordinator of the Programme gave a brief introduction about the Programme and its impact among the students of NE region.

The important aspects of this week-long programme included popular lectures by resource persons namely, Dr Ishwar Chandra Baruah, Principal Scientist, Assam Agricultural University and Shri Dhiren Gogoi, Science teacher, Dahotia M. E. School, who spoke on



Dr. R. C. Boruah speaking at the Inaugural Function

Biodiversity in North East India and *Low Cost Science Teaching Aids* respectively, visit to different divisions of the laboratory, scientific project work by students under the supervision of NEIST Scientists, face-to-face interactive session with NEIST Scientists and elocution competition among the participating students under different science topics.

Other activities included visit to premier institutions namely, Assam Agricultural University, Jorhat and Tea Experimental Station, Jorhat. In order to enhance students' knowledge about the architectural design and technology used

in construction during ancient days, the students were taken to ancient monuments of Deopahar of Numaligarh and Sivasagar.

The Programme came to an end with a Valedictory Function held on 26 March 2011 where Dr. N. C. Barua, Scientist G, NEIST attended as Chief Guest. In the Function, Dr Barua gave away the certificates to the participants and prizes to the winners of the Science elocution competition. The

students expressed their experience and feedback about the Programme.

Altogether 28 students and 6 teachers from seven High and Higher Secondary schools of Assam namely, Jawahar Navodaya Vidyalaya, Titabor (Jorhat); Jatiya Vidyalaya, Hatiyekhowa (Golaghat); Vidya Niketan, Rajgarh (Dibrugarh); Konimara High School, Barpeta; Sonai Rongchekon High School, Diphu (Karbi Anglong); Mini English High School, Diphu (Karbi Anglong) and Kawaimari Higher Secondary School, Teok (Jorhat) participated in the Programme.



CDRI, Lucknow Organizes *Holistic Health Education Programme* for Rural Schools

The Central Drug Research Institute (CDRI), Lucknow organized the *Health Awareness Lectures* and *Health Check-up Camp* at Disha Public School, Matee, District Barabanki on 25 March 2011 with the financial support from CSIR, New Delhi. The Camp was organized in collaboration with CMO office, Barabanki, in which about 300 students and staff of the school enthusiastically participated. The students were thoroughly examined by the team of doctors deputed by the Chief Medical Officer, Barabanki and medicines were distributed free of cost to the students as per the advice.

In parallel, scientific lectures on various aspects of health education were also organized. Scientists from CDRI namely, Dr. J. S. Srivastava, Mr. N. S. Rana, Dr. K. R. Arya and Dr. Mukesh Srivastava talked on different aspects of diseases, their care



Dr. Anita Singh, Guest Speaker from K. K. Hospital, Lucknow addressing the audience

and cure, safe environment, sanitation, personal hygiene and medicinal uses of plants. Dr. Anita Singh, Guest Speaker from K. K. Hospital, Lucknow, spoke on women's health with special reference to the problems faced by adolescents. Students were very enthusiastic as they raised a number of questions during the interactive sessions.

In the concluding session, Mr. N. S. Rana, Programme Coordinator,

presented mementoes to members of the medical team, Principal and staff of the school. He thanked the CMO, Barabanki and the medical team for successfully holding the health camp and also the Principal and staff of the school for their cooperation. Mr. V. K. Verma, Principal of the school expressed gratitude and stated that the Programme was extremely useful and students were immensely benefitted. He thanked the Director, CDRI and his team for such an excellent programme.



View of the interactive session

NEIST Organizes *Mushroom Training Under CSIR-800*

The North East Institute of Science & Technology (NEIST), Jorhat organized Training cum Demonstration Programme on, *Mushroom Cultivation Technology* at Dhakuakhana, Lakhimpur district during 2-3 February 2011. The training was conducted by Dr. P. R. Bhattacharyya, Scientist F and Dr. A. K. Bordoloi, PTO, where different aspects of mushroom cultivation along with practical demonstration was imparted to the participants. As many



Practical demonstration to the participants

as 34 selected participants comprising women SHGs and marginal farmers

participated in the training who expressed their keen interest to adopt mushroom cultivation not only for their diet supplement but also for economic benefit. In separate occasions, the Laboratory also organized similar programmes during 6 and 7 January 2011 at Tinsukia Kendriya Mahila Society hall and Sadiya town, Tinsukia district respectively where there were more than 100 participants from different parts of Tinsukia district.



CBRI Celebrates the Foundation Day

The Central Building Research Institute (CBRI) Roorkee celebrated its 65th Foundation Day on 10 February 2011 with usual gaiety and fanfare. The Institute was set up in 1947 to develop technologies suited to people of different income groups in various geo-climatic regions of the country with focus on indigenous material, local skills and eco-friendly approach.

Some of the landmarks achieved by the Institute are the utilization of agricultural and industrial wastes for building materials, developing technology for earthquake-resistant construction, rehabilitation work in natural disasters hit areas of the country and development of a device of gravitational and settling chambers of brick kilns to make them pollution free.

Speaking on the occasion, the Chairman of the Kinetic Engineering Ltd., Pune, Mr. Arun H. Firodia said that CBRI should use its technologies to develop model villages. He further said that the task of constructing cost-effective and durable habitats, in sync with the requirements of a particular region, could only be achieved by combining applied engineering and research. "By doing so, the whole scenario of the country,



Mr Arun Firodia, Chief Guest addressing the audience

through building model villages, will undergo a radical transformation within the next 30-40 years," he remarked.

The former Director of the Institute, Dr Rajendra Kumar Bhandari, Guest of Honour, lauded the pioneering efforts of the Institute in providing the most appropriate economic solutions for housing to the poorest of the poor while also providing expertise for the highly specialized structures. Highlighting the recent strides taken by the Institute, Prof. S. K. Bhattacharyya, Director, CBRI, said that the Institute is fully geared up



Release of CBRI Annual Report

to face the challenges of future. "Steps have been initiated to meet human resources crunch and along with research, courses on higher studies have been launched in the Institute," said Prof. S.K. Bhattacharyya. He also highlighted a new vision and the thrust of the forthcoming R&D programmes of the Institute.

The Foundation Day Function was also marked with the release of the CBRI Annual Report 2009-10, CBRI Information Brochure and a booklet on Ferro Cement by the dignitaries. On this occasion, a Diamond Jubilee Director's Award specially instituted for the development of technology/innovation/know-how having maximum societal impact for the year 2010-11 was given jointly to Dr. B. Singh and Dr. Manorama Gupta, Scientists, CBRI for their work on, *Production of Bituminous Poly-urethane Water Proofing/Sealing Compounds*. The Award comprises a citation and cash amount of Rs.5000/-. The technology know-how was recently transferred to the industrialist who intends to set up a manufacturing plant at Gwalior, Madhya Pradesh.

The Function was convened by Shri Y. Pandey, senior scientist of the Institute. He briefed on the history of the Institute highlighting its main R&D



achievements, professional & societal contribution of CBRI in resolving and overcoming the problems of durable,

safe and economical housing for the people of the country. He also introduced the guests to the audience.

Shri S.G. Dave, Scientist 'G' presented a Vote of Thanks.

Golden Jubilee Lecture Series Held at NEIST, Jorhat

Sixth Lecture Series

The 6th Golden Jubilee Lecture Series, as part of the Golden Jubilee celebration of NEIST, Jorhat was held at NEIST Auditorium on 14 February 2011. The meeting was chaired by Dr. P. G. Rao, Director, NEIST where Prof. V. G. Gaikar, Professor, Institute of Chemical Technology (ICT), Mumbai, delivered the lecture on, *New Strategies for Extraction of Active Products from Natural Resources* before the distinguished gathering of scientists, research scholars and invited guests.

In his Welcome Address, Dr. Rao mentioned that the lecture topic was very much relevant to this part of the country due to abundance of natural resources and said that the research activities of NEIST on medicinal and aromatic plants were significant. However, modern technologies are needed in R&D for isolation of these active ingredients. Prof. Gaikar while delivering the lecture gave a brief account of the ongoing activities at ICT, Mumbai and said that ICT has done



Prof V G Gaikar delivering the lecture

some pioneering work on the purification of active ingredients from natural resources and some methodologies have been developed in the area.

Prof. Gaikar added that the economic importance of natural products is immense as there is an increased interest in plant-derived drugs in recent years due to their efficacy, novel biochemical actions, drug semi-synthesis and their use as phytomedicines. Hence, the pharmaceutical industry require environment-friendly technologies for isolation of native components from natural resources, which is dependent

on the nature of compounds and raw material to be processed with the objective to get the highest purity product.

The second aspect of natural product purification is the separation of the desired components from a complex mixture with similar properties. However, a great deal of effort is required for development of separation and purification technology to produce the component in large quantities at a cheaper price. Prof. Gaikar said that in addition to the conventional solvent extraction method, some newer techniques like supercritical fluid extraction, microwave assisted extraction and ultrasound assisted extraction are also being used to facilitate extraction of natural products. Earlier, Dr. B. G. Unni, Scientist G gave the opening remarks while Dr. N. N. Dutta, Scientist G gave the introductory speech about the Chief Guest before the distinguished gathering. The meeting ended with a Vote of Thanks offered by Dr. S. Hazarika, Scientist, NEIST.

Seventh Lecture Series

The 7th Golden Jubilee Lecture Series, as part of the Golden Jubilee celebration of NEIST was held at NEIST Auditorium on 15 February 2011. The meeting was chaired by Dr. P. G. Rao,

Director, NEIST where Prof. Bandana Chatterjee, Professor, Department of Molecular Medicine/Institute of Biotechnology, The University of Texas Health Science Center, San Antonio,

Texas, USA delivered the lecture before the distinguished gathering of scientists, research scholars and invited guests.

Delivering her lecture on, *Androgen Receptor in Prostate Cancer – An*



Update on Treatment, Prof Chatterjee said that prostate is chronically exposed to androgen throughout the life time of an individual with Prostate cancer (PC) as the most common type of cancer found in men. Androgen deprivation is the major current therapy for advanced PC where the treatment exerts its effect on target tissue by either blocking androgen production or preventing binding of androgen to the androgen receptor (AR) and the consequence of both is interference with androgenic effects responsible for cancer cell growth stimulation while androgens play an essential role in the morphogenesis and physiology of the normal prostate. She added that the androgen receptor (AR) is an androgen-inducible transcription factor characterized by a modular primary structure, with each module representing a distinct functional unit.

“The cytoplasmic AR after its interaction with androgens is activated and translocated to the nucleus where it binds to target genes at the androgen responsive element(s) and recruits coregulators to form a multi-protein complex that interacts with



Prof Bandana Chatterjee delivering her lecture

transcriptional mediators and the basal transcription machinery to regulate gene transcription,” she said. She also said that the etiology of benign prostatic hyperplasia (BPH) and prostatic neoplasia, which can progress to adenocarcinoma, is androgen-dependent. This was observed when after androgen withdrawal and anti-androgen treatment, the androgen responsive prostate cancer cells cease to proliferate and undergo apoptosis, causing tumor regression, however, relapses are seen when tumors emerge as androgen-independent and apoptosis-resistant, she informed.

“Gene amplification and amino acid substitutions in the AR are detected at

a high frequency in recurrent tumor and these changes confer growth advantage to the tumor cells due to either hypersensitivity of AR to low, castrate level androgens or a realignment of the receptor conformation, leading to altered ligand specificity that enables anti-androgens, adrenal androgens and non-androgen steroids act agonistically to increase AR activity,” she said.

Persistence of signaling by the wild type AR in therapy-resistant tumors is due to the increased receptor activity caused by cross talk of AR with multiple intracellular signaling cascades, especially the growth factor activated MAP kinase/ERK and PI3 kinase/Akt pathways. Concluding her speech she said that the ablation of AR function using anti-sense oligodeoxynucleotides, ribozymes or small interference RNAs (RNAi) holds promise as future approaches to the successful treatment of hormone-refractory, apoptosis-resistant prostate tumors. Earlier, Dr. B. G. Unni, Scientist G gave introductory speech of the guest speaker. The meeting ended with the Vote of Thanks by Dr. P. K. Chowdhury, Scientist F.

Eighth Lecture Series

The North East Institute of Science & Technology, Jorhat celebrated the International Women’s Day as part of the Golden Jubilee Celebration with a well charted programme on 8 March 2011. The Function was presided over by Dr. P. G. Rao, Director, NEIST, where Dr. Mitali Mukerji, Senior Scientist, Institute of Genomics and Integrative Biology, New Delhi attended

as the Chief Guest and delivered the Women’s Day Lecture as the 8th Golden Jubilee lecture on, *Ayurgenomics: A Novel Approach Towards Personalized Medicine*.

The Function was largely attended by invited lady dignitaries from various Institutes in Jorhat District, distinguished scientists, students, and teachers, besides the scientific fraternity of NEIST. In her



Dr Mitali Mukerji, Senior Scientist, IGIB, New Delhi delivering the lecture. Also seen on the dais is Dr. P. G. Rao, Director, NEIST



Welcome Address Ms. Alokandanda Sengupta, Scientist F & Convenor of the International Women's Day celebration committee briefly spoke about the significance of the day. Ms Ilika Zhimo, Scientist gave the introductory speech of the speaker.

Delivering her lecture, Dr Mukerji said that the transition of a person from normal state to pre-disease and disease onset to its progress, the complications of disease, etc. vary from person to person. "However, there are also specific needs for prevention, diagnosis, screening, prognosis and customization of therapy with drug, diet and lifestyle at an individual level," she informed. She mentioned that in personalized medication approach there are both Ayurveda and Modern Genomics. Dr Mukerji said that the clinical genomics of the Human Genome Project leads to better targeting therapy with tailoring medicine for an individual patient of a specific disease.

"The *Prakriti* or lifestyle of the Indian Traditional Knowledge also mentions about the linkage of various body constitutions and cultural practices of human beings with different diseases in Indian Ayurveda which is more than 3200 years old," she said. "So combining the *Ayurgenomics* or modern genomic approach with reasonable leads from Ayurveda gradually may lead India for more efficient therapy in personalized medication which involves medicine, diet and lifestyle in a novel way," she mentioned.

Dr Rao in his Presidential remark said that NEIST has been celebrating International Women's Day on regular basis for the last few years. He made an appeal to address all women working in the 'scientist category' as *Scientist* and not *Woman Scientist*. Referring to the lecture topic, he mentioned that NEIST has been working on Traditional Knowledge of the NE Region and towards drug development. As a part of the celebration, an essay writing competition was organized and the winners were suitably awarded on the occasion. The programme concluded with the Vote of Thanks delivered by Ms. Sangeeta Sharma, Scientist, NEIST.

CBRI Participation in COGNIZANCE 2011, IIT Roorkee

As a part of creating awareness on *Alternative Cost-Effective Materials and Technologies* among the Engineering students of different institutions, the Central Building Research Institute, Roorkee participated in the 'COGNIZANCE 2011' organized by the Department of Metallurgical & Materials Engineering, Indian Institute of Technology, Roorkee during 11-13 March 2011.

The Institute displayed its appropriate cost-effective building materials and technologies by way of colourful and impressive charts on :-

- Pine Needle Composites
- Geo-Polymer Banded Bricks
- Panels and Door Shutters
- Concrete Masonry Blocks
- Improved Brick Production Technologies
- R&D on Fly-ash Utilization
- Wood Alternative using Plywood Veneer Waste
- Thermal Insulation Tile using Exfoliated Vermiculite Waste



Glimpses of COGNIZANCE 2011



About 500 professors and engineering students from various IITs, NITS and engineering colleges of the country witnessed the exhibition.

In the concluding session Prof. S.

K. Bhattacharyya, Director CBRI Roorkee, who was the Chief Guest of the Function apprised the guests and gathering on the CBRI R&D activities and PG course. The students showed

a keen interest in Post Graduate Research Programme in Engineering in EIDM and sought to know more about selection procedure for admission.

CBRI Showcases its R&D Efforts at Exhibition in Raj Bhavan, Dehradun

CBRI has been showcasing its R&D efforts in various parts of the country through exhibitions, demonstrations, training programmes especially on Earthquake Resistant Buildings, construction of cost effective housing in rural and urban areas etc. On the request of Lok Nirman Vibhag, Uttarakhand, the Institute participated in 'Spring Festival' (*Basant Utsav*) organized by Lok Nirman Vibhag, Uttarakhand Govt at Raj Bhavan, Dehradun from 4-6 March 2011.

Her Excellency Mrs Margrate Alva, Governor of Uttarakhand inaugurated the event and visited CBRI stall along with Shri Tripendra Singh Rawat Minister for Animal, Husbandry and Dairy Development, Uttarakhand State, Secretary & Deputy Secretary to Governor and some other dignitaries & important officials. The Governor also interacted with CBRI Scientists. There were about 25 stalls in the festival including G.B. Pant Agricultural University, Pant Nagar; Tea Development Board, Almora; Uttarakhand Akshya Urja Vikas Abhikaran etc.

The visitors were informed about the green building

materials & technologies developed by CBRI appropriate to the State including Concrete Blocks, Prefabricated Building Components, FlyAsh C-bricks, Calcium Silicate Bricks, Clay fly ash bricks Pollution Control System for Lime Kilns, Pollution Control Settling Chamber for Brick Kiln, Improved Rural Mud Housing Technologies and Low Cost Sanitation Pine Needle Composite Boards, Geopolymer Bricks, Rice Husk Plastic Wood, Natural Fibre Composite Panels and Door Shutters, etc.

CBRI stall was witnessed by

hundreds of people including several political leaders, Govt. officers, students, entrepreneurs, officials of voluntary organisations and other common people all and took keen interest in CBRI technologies. CBRI publications were distributed among interested visitors.

The stall was managed by Shri Ashok Kumar, Scientist EII, Sh. K. L. Chhabra, TO EII & Mr. Prem Lal TO, CBRI. The benefits of the creation of awareness regarding appropriate CBRI technologies thus reached thousands of people of local and surrounding areas.



A view of the Exhibition and visiting dignitaries



Farmer's Fair Organized at CIMAP, Lucknow

The farmers' fair (*Kisan Mela*) organized at the Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow, held in the recent past was attended by about 1500 people from different strata of society including farmers and entrepreneurs hailing from different States such as Uttar Pradesh, Bihar, Haryana, Punjab, Rajasthan among others. Out of these about 580 farmers got themselves registered for obtaining CIMAP agro advisory SMS service launched recently by CIMAP.

Prof. R. S. Kureel, Vice-Chancellor, Narendra Deo Agriculture and Technology, Faizabad; Dr. K. C. Gupta, Director, Indian Institute of Toxicology Research (IITR), Lucknow; Dr. C. S. Nautiyal, Director, National Botanical Research Institute (NBRI), Lucknow; Mr. S. Krishnan, Former IAS officer and Mrs Shantha Krishnan, Former Professor, Delhi University were the guests of honor in the Inaugural Session of the *Kisan Mela*.

In his Welcome Address, Prof. Ram Rajasekharan, Director, CIMAP thanked the farmers and all the guest for participating in CIMAP's *Kisan Mela*. He said that farmers act as catalyst to the research and development at CIMAP as scientists of the Institute have developed new plant varieties and technologies which can be useful to farmers. "CIMAP looks forward to regular feedback from the farmers and entrepreneurs for furtherance of medicinal and aromatic plants research and business," he added.

In his remarks, Prof. R. S. Kureel praised the efforts of CIMAP in organizing the *Kisan Mela*. He

exhorted the farmers to adopt new techniques and varieties for increasing yield of the medicinal and aromatic plants. Prof. Kureel said that regular interaction between farmers, industries and scientists will help to solve the problem of marketing in this area.

Director, NBRI, Dr. C.S Nautiyal in his address highlighted the need of taking the technologies to the villages. He said that the use of improved technologies and plant varieties of medicinal and aromatic plants will ensure the progress in the rural area.

Dr. K. C. Gupta, Director, IITR in his address lauded the role of CIMAP in the production and trade of menthol mint in the world market and said that farmers' cooperation in such endeavours is also noteworthy. He further said that farmers also apply innovative techniques in their fields.

Dr. A. K. Singh, Head, Technology and Business Development briefed about the various events of *Kisan Mela* and said that this event is assuming greater dimension in terms of participation over the years. He also highlighted the role of CIMAP in transferring technologies for the welfare of the society and farmers.

On this occasion, a variety of *Stevia* which is popularly known as the sweet herb or honey leaf and is the most remarkable sweetener in the world was released named as *CIMAP-Madhu*. This variety contains more than three times more yield of herb and contains three times stevioside content than the local variety.

Several stalls were also put up on this occasion which included stalls of CIMAP herbal products/publications, agro-advisory and SMS service



Prof. Ram Rajasekharan addressing the farmers



Release of souvenir 'Aus Gyanya'



A view of the participants



Women displaying fragrant herbal agarbattis



registration, display and sale of fragrant agarbattis by women self help groups established by CIMAP, private companies like Swaraj Herbal, Nishant Aromas, Gramin Aloe Producer Company Ltd., Biotech Park, Lucknow, Bank of India, Hardoi, and State Bank of India, Main Branch, Lucknow.

A very large number of the

participants visited these stalls and showed keen interest in the products and services displayed there. Besides, the seeds and planting material of improved varieties developed by CIMAP were displayed and supplied by CIMAP Research Farm to a very large number of farmers for multiplication and cultivation.

The scientists of CIMAP: Dr. Ashok Kumar Singh, Dr. Saudan Singh, Dr. D. D. Patra, Dr. Mansoor Alam, Dr. Alok Kalra, Dr. Sanjay Kumar and Dr. A. K. Singh along with Mr Shailendra Jain, Former President, Essential Oil Association of India interacted with farmers in the Technical Session.

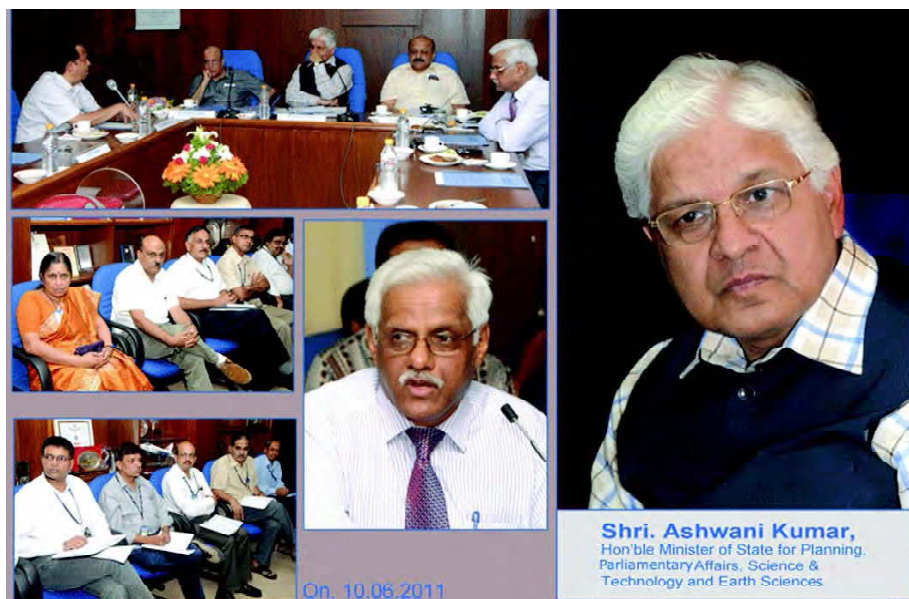
Dr. Ashwani Kumar, Hon'ble Minister of State for Planning, Parliamentary Affairs, Science & Technology and Earth Sciences, Govt. of India Visits NAL, Bangalore and NIO, Goa

National Aerospace Laboratories (NAL), Bangalore

Dr. Ashwani Kumar, Hon'ble Minister of State for Planning, Parliamentary Affairs, S&T, and Earth Sciences along with Dr. K. Kasturirangan and Dr. Suamitra Chaudhuri, Members, Planning Commission visited NAL on 10 June 2011. Dr. A. R. Upadhya, Director, NAL made a presentation on NAL's activities and future R&D proposals including that of NCAD.

The Hon'ble Minister referred to the declaration of the *Decade of Innovation*, and stressed on the need for increasing the pace of development, and promised all help from the Government. He was very enthusiastic about the NCAD proposal and expressed full support from the Government to the project, which he also reiterated later in the Press Conference. He also stressed up on the need for national level supercomputing facilities.

Later, the Minister paid a brief visit to the Flosolver Unit where he was



briefed about the *Varsha* software and its monsoon predictions.

The visit continued with a 40-minute Press Conference which was well received. In his statement at the beginning of the Conference, Dr. Ashwani Kumar announced to the media that NAL will be designing and

developing a National Civil Aircraft for regional connectivity. He also said NAL has completed a feasibility study on design and development of the aircraft that will help to connect Tier-II and Tier-III cities with major metros. He further said the development of the programme was of techno-economical interest as it



would have several spin-offs. “I wish we had more aircrafts, considering our own domestic demand. Of course, we are a bit delayed in this venture, but we will make up for the lost time,” he said. He further added, “NAL needs to move from pure science/research to developing innovative technologies. The Government of India will fully support these programmes accommodating all the financial needs.”

Dr. A.R. Upadhya, Director, NAL responding to a question from a correspondent said, “NAL would incorporate the latest technology to ensure the aircraft to be at par with any futuristic aircraft.” “The RTA is being explored for regional transport, with a passenger capacity of 70-100 seats. The development phase is expected to be completed in six years with the

development of a prototype. The certification and the induction of the first batch of five aircrafts is expected in about seven years after the launch,” he assured. He also said that NAL was already partnering with German firms and has signed MoUs in areas such as advanced avionics and next generation engines.

National Institute of Oceanography (NIO), Goa

Dr. Ashwani Kumar, Hon’ble Minister of State for Planning, Parliamentary Affairs, S&T, and Earth Sciences, Govt. of India visited the National Institute of Oceanography (NIO), Goa on 12 June 2011. He was briefed on the achievements, on-going projects and 12th Five Year Plan research proposals of NIO by Dr. Satish R. Shetye, Director, NIO.

The Hon’ble Minister also visited two laboratories: Geophysical Computing Laboratory and Laboratory for Study of Marine Biofouling & Marine Bioinvasion. Researchers working in these two laboratories briefed the Hon’ble Minister on the work being carried out in these labs.

The Geophysical Computing Laboratory is equipped with several workstations for handling large geophysical data acquired under different research programmes. The workstations are equipped with software for processing and interpretation of multi-channel seismic reflection and other geophysical data and are interfaced to support systems like digitizers and plotters. These facilities have helped NIO to successfully

complete several projects funded by National and International agencies and industries. The Hon’ble Minister was briefed on the importance of these projects that included: *Demarcation of Legal Continental Shelf (LCS) on Western Margin of India, Identification of Gas Hydrate Zones on Both Continental Margins, and Plate Reconstruction Analyses of the Gondwanaland Fragments.*

Marine Biofouling & Marine Bioinvasion laboratory has been set up to develop port specific ballast water management plans for major ports of India. This work is being carried out in association with Directorate General of Shipping, Ministry of Shipping. Marine bioinvasion through shipping activities (ballast water and biofouling) is a major concern for the health of the ocean and functioning of marine ecosystems. This issue has drawn the attention of International Maritime Organization (IMO) and a convention on ballast water management has been adopted.

The importance of the threat arising from transfer of ballast water from



Hon’ble Minister of State Dr. Ashwani Kumar interacting with NIO Scientists



one ocean to another surfaced in the media recently when the earthquake in Japan led to the leakage of radioactive material from nuclear power plants into nearby marine waters. NIO has plans to implement Electronic Ballast Water Reporting at the major ports in India in

order to facilitate ballast water risk assessment and decision support system for Ballast Water Management.

The Hon'ble Minister was also briefed about the support that NIO provides to industries. The services provided by the Institute are multi-disciplinary and

include environmental impact assessment, environmental data collection, mathematical modeling and related studies. The Hon'ble Minister expressed satisfaction on the achievements of the Institute. He interacted with the project leaders during the visit.

IICB Scientist Honoured with *Sir J. C. Bose National Fellowship*

Dr. Pijush K. Das, Scientist, Indian Institute of Chemical Biology (IICB), Kolkata has recently been awarded *Sir J.C. Bose National Fellowship* from the Department of Science & Technology (DST). Dr. Das has had a brilliant academic record throughout starting from standing 3rd in Assam in Secondary Exam, 1st Class 6th in B.Sc. (Chemistry Major) and 1st class 2nd in M.Sc. (Biochemistry) of Calcutta University.

Dr. Das did his Ph.D. in Biochemistry from Calcutta University and post-doctoral research at National Institutes of Health (NIH), USA. He set up his own laboratory at IICB in 1987 and made significant contributions in understanding the biology of macrophages with a view to formulating strategies for better therapy against macrophage-associated diseases using visceral leishmaniasis as the model disease.

One of the most important contributions of Dr. Das was the development of a highly selective and effective neoglycoprotein-mediated macrophage-directed delivery system



having the potential of horizontal access to macrophage-associated diseases in general. As a cell biologist, his work on extracellular matrix binding proteins comprising the isolation, detailed molecular characterization and elucidation of the role of laminin-binding protein in the pathogenesis of *Leishmania* opened up a basis for successful homing of microbes to their physiological address.

The current research activities of Dr Das address to decipher the molecular mechanisms of (1) faulty signal transduction pathways instituted by *Leishmania* towards neutralizing the robust defensive machinery of macrophages and (2) modification of cyclic nucleotide signaling within the parasites to better equip themselves for

successful infection and survival within the hostile environment of the host. He authored over 80 research articles and mentored about 20 Ph.D. students.

Dr. Das is actively engaged in teaching in Calcutta University, Jadavpur University and West Bengal University of Technical Education. As visiting scientist, Dr. Das visited Memorial Sloan-Kettering Cancer Center, New York, USA in 1990 and 1995, Max-Planck Institute of Biochemistry, Munich, University of Hamburg, Humboldt University, Berlin in 1998, University of Rome, Italy in 2008 and Aarhus University, Denmark in 2010.

Dr. Das had been elected as Fellow of INSA (FNA) in 2007, Indian Academy of Sciences, Bangalore (FASc) in 2003, National Academy of Sciences, Allahabad (FNASc) in 1997 and West Bengal Academy of Science and Technology (FAScT) in 1998. He received P.B. Rama Rao Memorial Award from Society of Biological Chemists and the Senior Scientist Oration Award from Indian Immunology Society.



IICT Scientist Wins *NASI-Scopus Young Scientist Award*

Dr. S. Venkata Mohan, Scientist EI, Bioengineering and Environmental Center (BEEC), Indian Institute of Chemical Technology (IICT), Hyderabad received the prestigious '*NASI-Scopus Young Scientist Award for 2010*' in Earth, Oceanographic & Environmental Sciences category by The National Academy of Sciences (NASI), India and M/S Elsevier for his research contribution in Environmental Science and Engineering. The Award was conferred at a ceremony held in the recent past at the National Institute of Immunology, New Delhi.

Dr. S. Venkata Mohan receiving the Award from Dr T. Ramasami, Secretary, DST and Dr Manju Sharma, former Secretary, DBT and former President of NASI. Dr A Surolia, Director, National Institute of Immunology and Mr Goki Ishikwa, Director, Elsevier, Asia Pacific are also seen.



ProSPER.Net-Scopus Young Researcher Award in Sustainable Development

Dr. S. Venkata Mohan, Scientist EI, Bioengineering and Environmental Center (BEEC), Indian Institute of Chemical Technology (IICT), Hyderabad was awarded the '*ProSPER.Net-Scopus Young Researcher Award in Sustainable Development for the year 2010*' in Energy Category jointly by United Nations University, International Bureau of the BMBF, Germany and M/S Elsevier for his research in using waste/

wastewater to generate clean biofuels.

This Award is given annually to young scientists/researchers, based in the Asia-Pacific region, who have made significant contribution in the area of Sustainable Development based on the number of citations, number and quality of publications and patents, and documented social impact. He was conferred with the Award at a symposium held at Tongji University, Shanghai, China.



Dr. S. Venkata Mohan receiving the Award from Chairman, Panel of Judges, Prof. G. N. Tiwari, Center for Energy Studies, IIT, Delhi at a Function held in Tongji University, Shanghai, China

Young Engineer Award 2010 to NEIST Scientist



Mr Dipankar Neog, Scientist, General Engineering Division, NEIST, Jorhat has been awarded the Young Engineer 2010 Award by Senior Engineers Forum of Greater Guwahati during the 7th Foundation Day Celebration of the Senior Engineers Forum of Greater Guwahati at Pragjyoti ITA Centre, Guwahati.

The Award is given in recognition of the excellence, outstanding performance, capability and professional ethics exhibited by Young Engineers below 35 years of age in their respective fields of work.



Dr. B. G. Unni Nominated as Member, *International Advisory Council Fulbright Academy of Science & Technology, USA*

Dr. B.G.Unni, Scientist G and Area coordinator (Biotechnology/Biological Sciences), NEIST, Jorhat has been nominated as a Member, International Advisory Council Fulbright Academy of Science & Technology, USA. Dr. Unni is the only Indian nominated from India along with other members from USA, Egypt, Switzerland, UAE, UK and El Salvador.

Dr. Unni is a Fulbright Fellow (1988 Batch) and is the Secretary of Fulbright Alumni Association North-East Chapter for the last 18 years. Dr. Unni was selected as the Best Fulbright Chapter leader from South East Asia (2006) and was nominated by United States India Education Foundation (USIEF), Delhi to represent the

Fulbright Alumni from India at the International Fulbright Alumni meet held at Marrakech, Morocco during the Year 2007.

The Fulbright Academy of Science & Technology (FAST) is an independent organization committed to improve the state of the world by leveraging the unique knowledge, abilities and connections of the Fulbright Alumni Community. FAST is like a National Academy of Science, a unique network of prestigious scholars addressing issues of critical concern such as health, education, environment and economic development.



FAST energizes communities of Fulbright Alumni and enables the exploration of the issues, trends and technologies. It empowers the alumni, individually or collectively, to tackle problems in their sector, their community or their

country. FAST was established by alumni of the Fulbright Exchange Program and other members of the science and technology community. Fulbright network of more than 100,000 scientists around the world work together globally to enhance innovation and advance education and provide opportunities for research collaborations.

IMTECH Scientist Bags the *Award of Excellence in Environmental Management and Fellowship of SAB (FSAB)*

Dr. Swaranjit Singh Cameotra, Scientist F, IMTECH has been given the Award of Excellence in Environmental Management by the Society of Applied Biotechnology. Dr. Swaranjit had joined MTCC/IMTECH in 1987, in the formative years of IMTECH. He was a team member who helped in the elevation of MTCC into a reputed Culture Collection & Gene Bank and an International Depository Authority (IDA). Dr. Cameotra has done excellent work on the degradation of toxic environmental pollutants like oil sludge, pesticides, heavy metals & metalloids and dyes. He also works on Biosurfactants and Lipase that is used for biofuel energy production. He has guided five Ph.D. students and has about 100 international publications including book chapters.

Dr. Swaranjit was also elected as a Fellow of SAB (FSAB) for his contribution in Applied Biotechnology. Citation index (CI) of his publications is 1500, Impact Factor is 130 and *h index* is 16.



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