

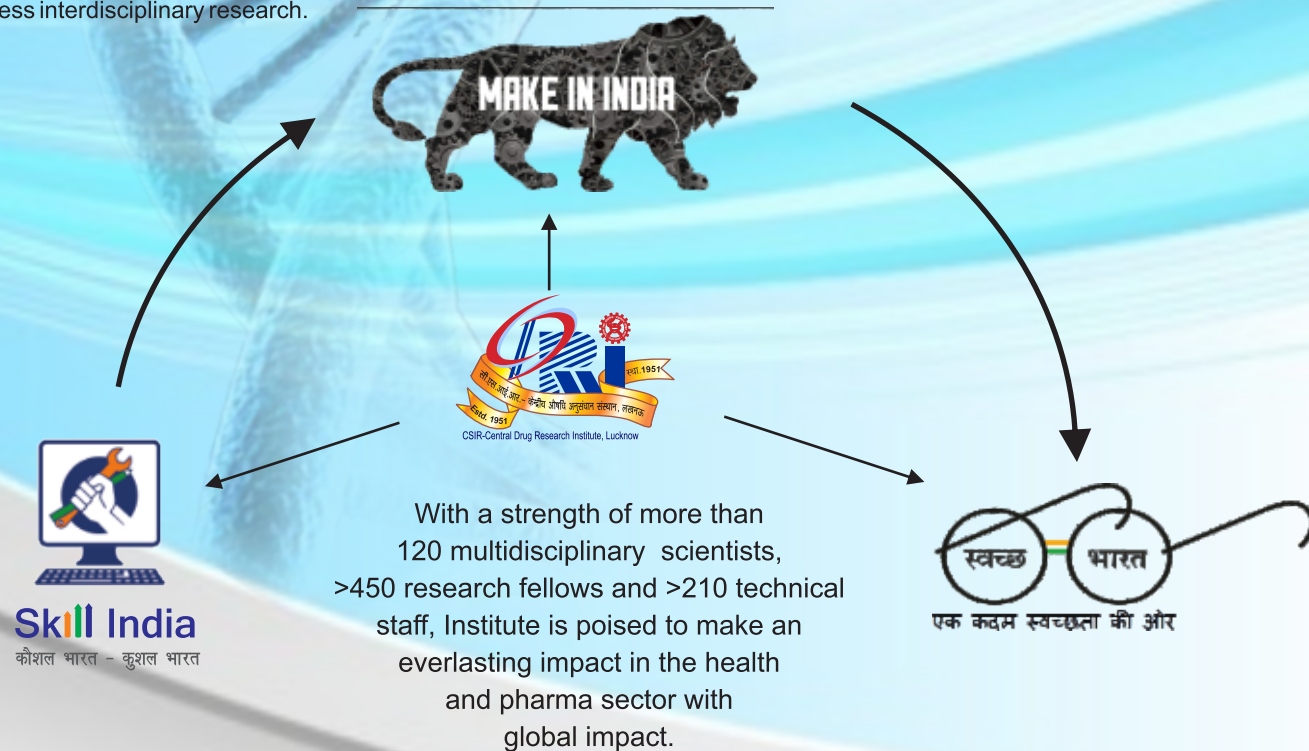
DECLARATION

Under the invigorated social ecosystem in India, aiming to be a superpower, it is a challenge to prove our relevance. Despite, India is being called as Pharmacy of World owing to affordable generics that it produces for the whole world, populace is facing unforeseen challenges in healthcare. Incidences of parasitic and infectious diseases are creating havoc while life style disorders are crippling the society like never before. CSIR-CDRI is poised to take up these newer challenges owing to its fundamental strength in the infectious and life style diseases. With an aim of specific deliverables in the "Science, Technology & Innovation Space of Nation, Institute determined to serve as a nodal centre in converting 'hits' into 'new drug candidates' by involving its expertise from various disciplines like Medicinal Chemistry, Pharmacology, Pharmacokinetics, Pharmaceuticals and Animal Toxicity and on the other hand pursue R&D in disease areas of national priority and some foresighted health problems likely to affect a large section of the world population in near future. While working for the new products and technologies, Institute will strive for fundamental research to be ready for future challenges.

The initiatives of setting up of Biopharma Industry Incubator, GLP certified labs for complete range of Investigational New Drug studies and National Centre for Laboratory Animals under the umbrella of CSIR-CDRI, Lucknow will definitely have tremendous impact on new drug discovery & development, revenue generation and entrepreneurship. Institute is looking to re-establish a strong linkage with Industries and Academia in a mutually benefitting way. With the aim to provide highest quality personnel to lead and drive the aspirations of modern India in health and pharma sector, Institute will focus to maximize the number of qualified researchers and professionals of impeccable quality in the domain of biomedical research; and to equip them with the skills to innovate and conduct seamless interdisciplinary research.

Commitments to National Missions

- ✓ Technologies, Products and Services for Make in India, Innovate in India and Swasthya Bharat Missions
- ✓ Be a catalytic agent to evolve India into Samarth Bharat-Sashakt Bharat
- ✓ Achieve global standards
- ✓ Cater to aspirations of common man and develop technologies beneficial to the poor
- ✓ Bring confidence to society about relevance of lab in terms of Social impact



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Compiled by Dr DK Dikshit & Dr Anand Kulkarni
Published by Dr Anand Kulkarni, Senior Scientist, Director Secretariat
on behalf of the Director, CSIR-CDRI, Lucknow

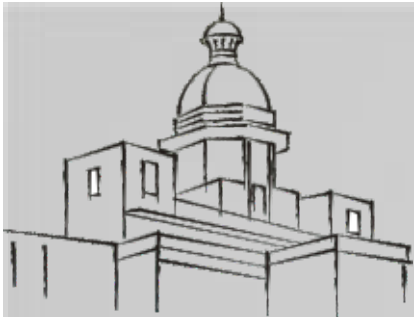


CSIR Central Drug Research Institute



**SPEARHEADING
SCIENCE & INNOVATION
FOR HEALTH & PHARMA SECTOR
WITH A HUMAN FACE**





INCEPTION

The scientific revolutions of 20th century and two world wars had huge impact on developed as well as developing countries. During this period, technologically India was still in very primitive stage and was exclusively dependent on developed countries. Very soon, National leaders and think tanks of pre-independent Government of India and other legendary leaders realized the need to create Science and Technological knowledge base for stability of the Nation. With a motto of self-reliance, Government of India established several laboratories dedicated for the Science & Technological developments in a range of sectors including Health, Food, Agriculture, Energy, Transportation, Aviation etc. Central Drug Research Institute, Lucknow is the Seventh among the laboratories established with above rationale as a constituent laboratory of Council of Scientific and Industrial Research, New Delhi.

The idea for the establishment of CSIR-CDRI was mooted first by Dr B. Mukerji, the then Director of Biochemical Standardization Laboratory, Kolkata, in his Presidential address to the Physiology section of the Indian Science Congress at Nagpur in 1945. This was later worked out to fruition with the coordinated efforts of Dr Mukerji, Dr Jivraj N. Mehta, the then Director General, Medical & Health Services, and Dr S.S. Bhatnagar, the then Director, Scientific & Industrial Research, duly endorsed by the Board of Scientific & Industrial Research in its 19th meeting held on 24th August 1947. This meeting was held in both momentous & turbulent periods just after the Independence of India. It reflected the urgency and commitment of the Government to establish the CDRI.

The actual location of the Institute was not an easy decision to take amongst the list of suitable places offered by the State Governments – The Ramsay Hospital, Nainital; Allahabad Club Building, Allahabad; Chatrar Manzil Palace, Lucknow; and Snowdon, Shimla. The final decision to base it at Chatrar Manzil Palace was influenced by the proximity of the King George's Medical College, Lucknow a premier center for Medical Health & Research in the country, being only a mile away.

The CSIR-CDRI would not have been what it is today had it not been part of a larger, vibrant and innovative organization that is the CSIR. The CSIR-CDRI has truly translated the CSIR mission of industrial research by way of developing commercially viable new drugs, which is evident from the distinction it has achieved by developing 13 new drugs till date and by helping industry through process innovations and highest quality human resource.

"I think it is quite essential, specially from the national point of view, to promote drug research and the manufacture of important drugs to treat epidemics, to improve the public health. I think that by our research work, we can find out new drugs for curing diseases, not only for ourselves but for the world."

The Ayurvedic and Unani systems can be utilized only in so far as they put themselves in line with scientific methods. I have no doubt that there is much in that accumulated experience so far as curative remedies such as herbs and applications are concerned. But I am equally convinced that if we are to progress at all we must adhere strictly to scientific methods".

—Pandit Jawaharlal Nehru

These words of Pt. Jawaharlal Nehru, spoken during Inauguration of the CSIR-Central Drug Research Institute, Lucknow on 17th February 1951, hold the hope, expectations of the free India and ring true even today in the national context. Formally inaugurated on that day, the institute was seventh in the chain of National Laboratories set under the aegis of the Council of Scientific & Industrial Research to carry out drug research in all its aspects and to build a strong scientific & technological base for the development of Pharmaceutical & Drug Industry in the country.

Chatrar Manzil Palace, a strong hold of those who revolted against British rule in 1853, was handed over to the CSIR in 1949 to revolutionize Indian Pharma Sector for technological independence in Health sector.

Functional Institute was formally inaugurated on 17th February, 1951, with five R&D divisions and a skeletal staff of scientists and technicians.

Sir Edward Mellanby, Hon'ble Shri Pt. Jawaharlal Nehru, H.E. Shri Homi P. Mody and Dr D.L. Shrivastava at Chatrar Manzil premises (17 February 1951)

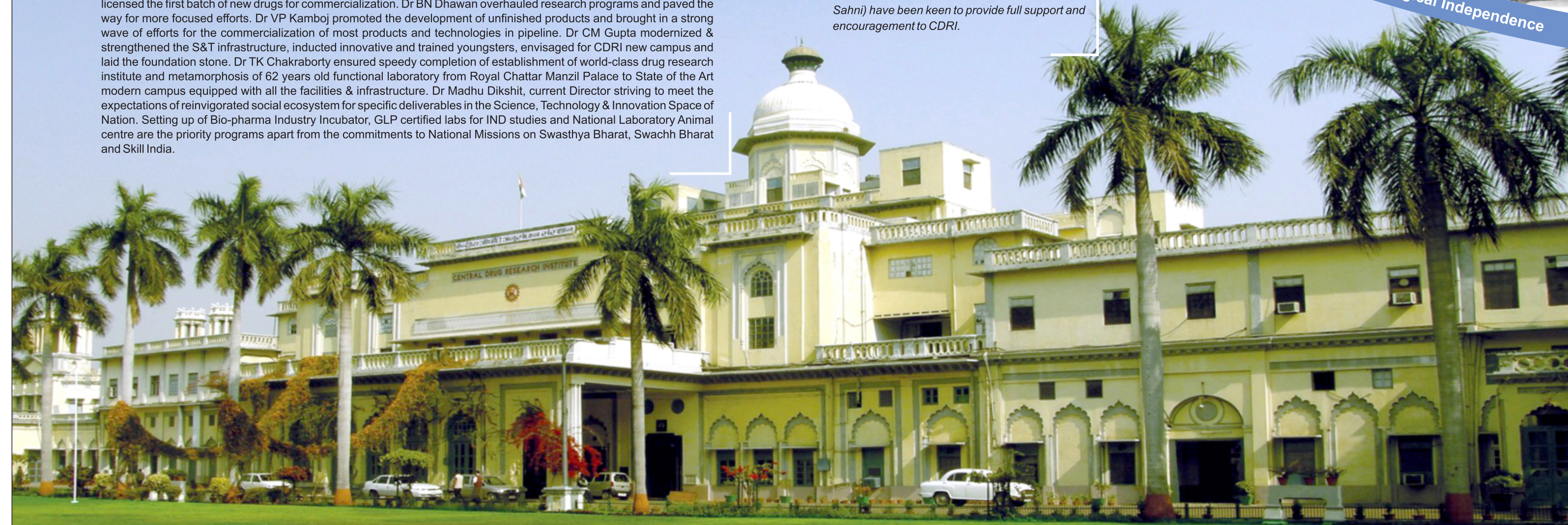
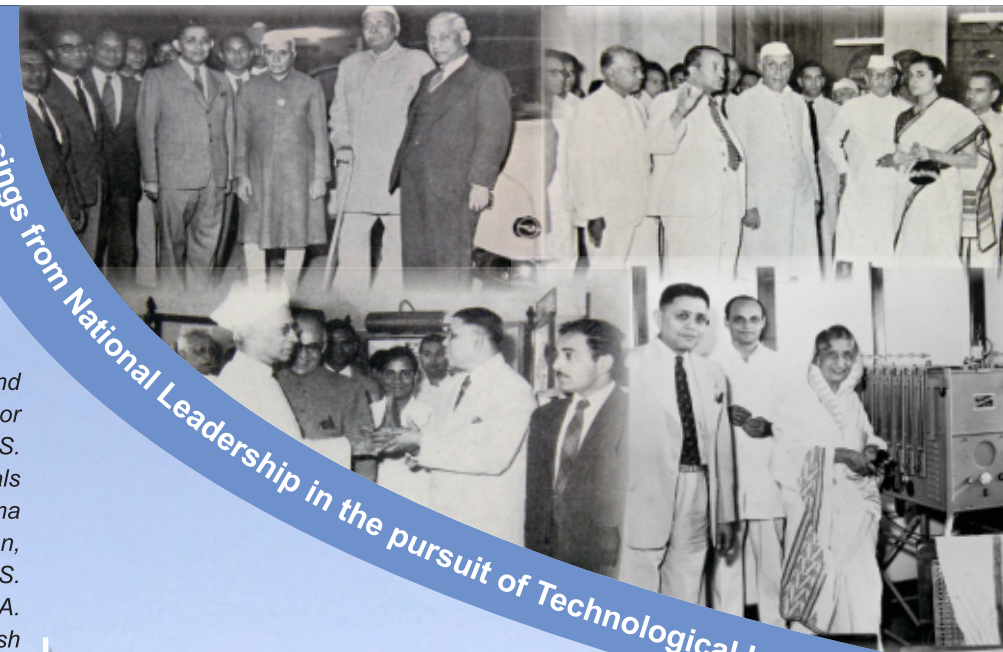
AUGMENTATION

The academic foundation of the Institute was laid thoughtfully by Sir Edward Mellanby, the first Director of the Institute and an eminent medical researcher, who set the tone and tenor of the institute and recruited scientists. Amongst the initial scientific appointments the following must be mentioned: Drs. R.P. Rastogi, S. Bhattacharji, V.N. Sharma were taken from the research group of Sir S. Siddiqui, the most eminent phytochemist of the country at that time, Dr. M.L. Dhar who had worked with Prof. C. Ingold, UK, Dr. M.M. Dhar (Manchester, UK) to form core group to investigate Indian plants; Dr Nitya Anand (Cambridge, England) for Medicinal Chemistry, Dr. B.N. Singh, Dr. S.K. Gupta & Dr K. Bhaskaran for Microbiology, Dr A.B. Kar for Endocrinology, Dr. C.L. Krisnamurti & Dr. S.C. Agrawal to set up Biochemistry & Biophysics, Dr. J.D. Kohli for Pharmacology, and several others who later rose to highest positions in science.

The current CSIR-CDRI is the result of hard work of all its former and existing staff at all levels under the guidance and support of visionary Directors of the Institute. Dr B Mukerji, the first Indian Director created and laid down the initial infrastructure. Dr ML Dhar superbly administered research programs and inducted talented scientists. Process technology for many essential drugs including Paracetamol was developed and transferred to industries, leading to affordability of drugs for Indian population. Dr Nitya Anand steered creative industrial research focused for new drug discovery and development. Inducted men and material facilities including set up for pre-clinical studies. Dr MM Dhar licensed the first batch of new drugs for commercialization. Dr BN Dhawan overhauled research programs and paved the way for more focused efforts. Dr VP Kamboj promoted the development of unfinished products and brought in a strong wave of efforts for the commercialization of most products and technologies in pipeline. Dr CM Gupta modernized & strengthened the S&T infrastructure, inducted innovative and trained youngsters, envisaged for CDRI new campus and laid the foundation stone. Dr TK Chakraborty ensured speedy completion of establishment of world-class drug research institute and metamorphosis of 62 years old functional laboratory from Royal Chattar Manzil Palace to State of the Art modern campus equipped with all the facilities & infrastructure. Dr Madhu Dikshit, current Director striving to meet the expectations of reinvigorated social ecosystem for specific deliverables in the Science, Technology & Innovation Space of Nation. Setting up of Bio-pharma Industry Incubator, GLP certified labs for IND studies and National Laboratory Animal centre are the priority programs apart from the commitments to National Missions on Swasthya Bharat, Swachh Bharat and Skill India.

The CSIR-CDRI has received full support and admiration of all the past and present Director Generals of the CSIR. Right from the days of Dr S. S. Bhatnagar, all succeeding Director Generals (Dr M.S. Thacker, Dr S. Hussain Zaheer, Dr Atma Ram, Dr Y. Nayudamma, Dr A. Ramachandran, Dr M.G.K. Menon, Dr C.S. Siddhu, Dr S. Varadarajan, Dr A.P. Mitra, Dr S.K. Joshi, Dr R.A. Mashelkar, Dr S.K. Brahmachari and Dr Girish Sahni) have been keen to provide full support and encouragement to CDRI.

Blessings from National Leadership in the pursuit of Technological Independence



Directors, who translated the Vision into Reality. Leveraged knowledge and core strength to meet the expectations of the Nation. Mentored young researchers for National Needs. Modernized the capabilities for future.



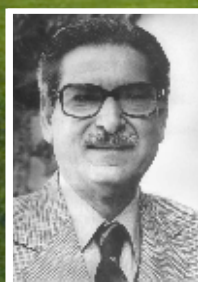
Sir Edward Mellanby
(1950-51)



Dr B. Mukerji
(1951-63)



Dr M.L. Dhar
(1963-74)



Dr Nitya Anand
(1974-84)



Dr M.M. Dhar
(1984-88)



Dr B.N. Dhawan
(1988-92)



Dr V.P. Kamboj
(1992-97)



Dr C.M. Gupta
(1997-2007)



Dr T. K. Chakraborty
(2009-13)



Dr Madhu Dikshit
(2015-present)



Dr PV Sane
Director, NBRI
(1997)



Dr Rakesh Tuli
Director, NBRI
(2007-08)



Dr SK Puri
Chief Scientist, CDRI
(2014)



Dr Ram Vishwakarma
Director, IIIM
(2014-15)

Institute acknowledge the contribution of interim directors for stable, progressive functioning of the Institute & inculcating best practices from their labs during their regime

DEDICATION

When we glance back on the drug availability to Indian population at the time of independence, we observe that the era was dominated by the multinationals. Drug prices in India, one of the poorest countries in the world with an average life expectancy of 32 years, were one of the highest in the world. Many of the drugs were beyond the reach of majority of Indians. India at that time followed a product patent regime, and the Indian pharmaceutical industry was almost non-existent. Thus, soon after its creation, CSIR-CDRI started serving as a "think tank" and took upon a critical and multifaceted role: (i) advising government on important policy initiatives for starting and promoting drug R&D in India from scratch; (ii) developing process technologies and new products; (iii) catered to the much needed human resource needs of the pharma industry, academia and government agencies; (iv) produced top level science managers who rose to the top positions of their respective organizations.

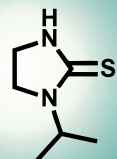
The highest priority was given for the developing resources for research in Infective/ bacterial diseases, birth control, investigational chemistry & pharmacology of Indian medicinal plants, process development and fermentation. The

researchers did tireless & innovative work with limited resources in those times of austerity and little availability of foreign exchange and created a research base on which the later strengths and capabilities rested.

The most important and fortunate development in mid-sixties were the planned efforts by chemistry & endocrinology teams under the leadership of Dr Nitya Anand and Dr AB Kar to do extensive studies in search of a post coital female contraceptive, and also on male contraception with WHO support. Another important development in mid-sixties was to forge collaborative program with LEPTIT SPA -Italy; Eli Lilly-USA, and Riker corporation-USA on compounds acting on central nervous systems & contraception which not only provided much sought of imported chemicals & equipments but also resulted in transfer of contemporary scientific protocols to the institute.

Charter

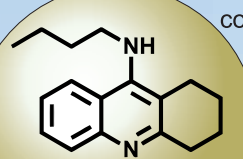
- ❖ Development of new drugs and diagnostics.
- ❖ Cellular and molecular studies to understand disease processes and reproductive physiology.
- ❖ Development of contraceptive agents and devices.
- ❖ Systematic evaluation of medicinal properties of natural products.
- ❖ Development of technology for drugs,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



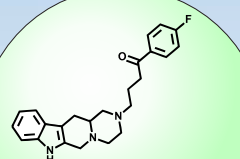
Centimzone (Antithyroid)
Licensed to Unichem Lab. Ltd., Mumbai (1972)



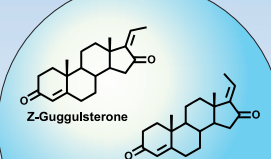
Isaptent (Cervical Dilator)
Licensed to Unichem Lab. Ltd., Mumbai (1972)



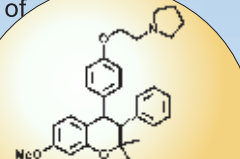
Centbucridine (Local anaesthetic)
Licensed to Themis Chemical Ltd., Mumbai (1987)



Centbutindole (Neuroleptic)
Licensed to Chemosyn Pvt. Ltd., Mumbai (1987) & Merind Ltd., Mumbai (1997)



Gugulipid (Hypolipidemic)
Licensed to Cipla Ltd., Mumbai (1987)



ACCLAMATION

CSIR-CDRI has always been successful in meeting the expectations of the scientific community in general and common man of the country or the taxpayer in particular. The scientific achievements of the institute and its scientists and infrastructure capabilities built up over the years have largely been appreciated. The common taxpayer of the nation witnessed a momentous occasion of the fruitful achievements on 31st January 1987, the day, the then Prime Minister of India Shri Rajiv Gandhi and Shri K.R. Narayanan, State Minister of Science & Technology launched 3 drugs viz. Centbucridine, Centbutindole and Gugulipid and a diagnostic kit for filariasis for marketing. Soon after that, Nation witnessed another historical day on 28 February 1996, when, the then Prime Minister of India, Shri P.V. Narasimha Rao released two new drugs viz. BESEB and Chandonium Iodide and two new drug technologies viz. Acylovir and Leuprolide and a Diagnostic kit for Leishmaniasis. This was the second time that the Prime Minister of India had released drugs discovered and developed by CSIR-CDRI to the Nation; a rare proud moment for any Institute. Currently, four drugs and two technologies are in national and international market.

So far, CSIR-CDRI developed more than 85 cheaper and more convenient technologies for known drugs at pilot plant levels which were transferred to drug industry where they have been successfully employed. Institute holds a rich kitty of 211 in force patents across the globe and 135 in force patents in India. Institute has published more than 10,000 research articles, 350 book chapters and 50 books. Institute has produced more than 1,200 Ph.D. scholars in the area of biomedical sciences and imparted post graduate level training in biomedical sciences to more than 5,000 students from different academic institutions/universities and sponsored training in specialized techniques to 2,000 candidates.

Institute and its scientists have received large number of prestigious honours and awards of national and international reputation including Padma Shri, SS Bhatnagar Awards, JC Bose Fellowships, CSIR Technology Awards for Innovation, Fellowship of all the three National Science Academies, etc.

Important Process Development and Technology Transfer

Disease Area	Generic(s)	Company
Antimalarial	Artemether	IPCA
Antimalarial	Primaquine	Nicholas Piramal
Antimalarial	Mefloquine	Wockhardt
Anti-Viral	Acyclovir	Ranbaxy
Anti-Asthmatic	I-Ephedrine HCL	Malladi Drugs & Pharma
Analgesic	d-Propoxyphene	Wockhardt
Analgesic	Paracetamol	Dufor-Interferon & 10 other companies
Antituberculosis	D-2-Aminobutanol	Themis
Brain Stroke	Herbal medicament	Themis Medicare
Hepatoprotective	Picroliv	DIL, Mumbai

So far, CSIR-CDRI has transferred more than 85 Process Technologies to Industries

Padma Shri
4

Shanti Swarup
Bhatnagar
Prize
7

CSIR
Technology
Award for
innovation
3

JC Bose
National
Fellowship
3

Fellow of
Indian
Academy of
Sciences
8

Fellow of
Indian National
Science
Academy
22

Fellow of
National Academy
of Sciences,
India
26

CSIR
Young
Scientist
Awards
8

Research
Publications
>10,000

Ph.D.'s:
>1,200
Trainings
>7,000

Patents
in force
Abroad: 211
India: 135

Process
Technologies
>85

New
Drugs
13

HIGHLIGHTS OF ACCOMPLISHMENTS IN THE SERVICE OF NATION

COUNTING IS ON....



TRANSFORMATION

Liberalization, Privatization and Globalization at the dawn of 21st Century, flavored with new aspirations of ambitious India to be a global force, unwrapped arrays of new challenges, hopes, and opportunities. To remain in the foray and to prove our relevance with excellence, there was urgent need to adopt the paradigm shift in drug R&D approaches.

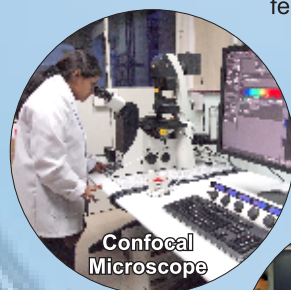
The first high impact recourse to enhance our competitiveness and global impact was initiated during 9th Five year plan period 1997-2002. S&T infrastructure and facilities were upgraded, quality systems and high standards were adopted and efficiency at all levels was enhanced. Creation of Molecular & Structural Biology Division, Drug Target Discovery and Development Division, Bioinformatics, QSAR, Combichem made a huge everlasting impact. The CSIR Modernization Program initiated by Dr RA Mashelkar, the then Director General, CSIR under 9th Five Year Plan period had a resounding impact on modernization drive at CDRI. Institute adopted the strategy of synergy of creative thinking, joint programs, collaborations and linkages within and with outside institutions and pharma industry.

Considering the inherent challenges for modernization drives in Chatter Manzil palace, being a national heritage building, a need for setting up a state of the art new CDRI was felt. Feisty efforts by Dr. CM Gupta and patronage of Dr

Mashelkar, project on new CSIR-CDRI became a reality. Laying down of the foundation stone on 4 August 2007 by the then Hon'ble Minister of Science & Technology and Earth Sciences, Mr. Kapil Sibal, was an important step in carving the transformation of CDRI. With the persevering efforts by Dr TK Chakraborty, Institute successfully accomplished setting up of state of the art new campus and shifting of fully functional 62 years old laboratory to its new premises in 2012.

State of the Art Facilities

- New Drug Discovery Facilities for
 - Parasitic & Infectious Diseases
 - Life Style Diseases
 - Reproductive Health and Osteoporosis
 - Cancer
- Pre-Clinical Regulatory Facilities for Drug Development
- National Laboratory Animal Centre
- Bioinformatics and Computational Facility
- Sophisticated Analytical Instrumentation Facility
- National Repository of Organic Compounds
- Knowledge Resource Centre
- Clinical Trial Centers: □PGIMER, Chandigarh, □ KGMU, Lucknow, □ KEM, Mumbai



Confocal Microscope



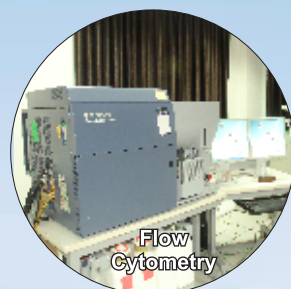
Small Molecule X Ray Crystallography



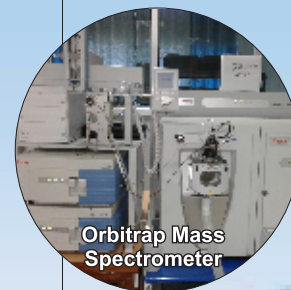
Atomic Force Microscope



Intra-vital imaging Facility



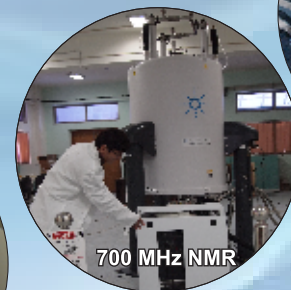
Flow Cytometry



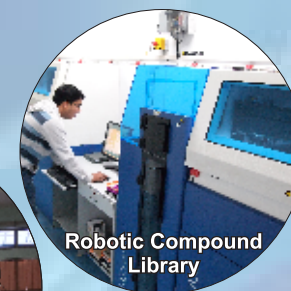
Orbitrap Mass Spectrometer



New Generation DNA Analyser



700 MHz NMR



Robotic Compound Library



Auditorium



Knowledge Resource Centre



Staff Recreational Facility

State of the Art Equipments

- Nuclear Magnetic Resonance Spectrometers
- Mass Spectrometers
- X-ray Crystallography
- Flow Cytometers
- Microscopes: Electron, Confocal, Intravital & Atomic Force
- Oxymax Comprehensive Lab Animal Monitoring System (CLAMS)
- Micro-CT & Echo MRI
- *In vivo* Animal Imaging System
- Micro-ultrasound Imaging System
- Seahorse Extracellular Flux Analyzer
- Label Free Interaction Lab (Biacore)
- New Generation DNA Analyzer

Only laboratory in the Asian Continent having everything under one roof for discovery and development of drugs from Conceptual stage to Commercialization



Annual Day Celebrations 2012 with Prof P. Balam, Director, IISc and Padma Shri Dr. Nitya Anand (17 February 2012)



Dr Girish Sahni, Director, IMTECH felicitated by Dr. SK Puri in International Year of Crystallography Celebrations (12 November 2014)



Licensing of Dalzbone to Pharamanza Herbal Pvt. Ltd. Dr. M.O. Garg, DG, CSIR, Team ASTHI and Industry representative (10 April 2015)



Dr Ram Vishwakarma presenting a memento to Dr. Harsh Vardhan, Hon'ble Minister, S&T and Earth Science, during his visit (11 April 2015)



Dr Madhu Dikshit, with CDRI Team NMITLI congratulating them for CSIR Technology Award for Innovation (26 September 2015)



Launch of new herbal medication for bone health by Dr Soumya Swaminathan, Secretary, DHR (17 February 2016)