

INSTITUTES OF PHARMACEUTICALS EDUCATION & RESEARCH (NIPER),

MOHALI

Contact Details:

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NIPER, SAS Nagar, Mohali was initially registered as a society under the Societies Act. The Faculty for the institute was appointed in 1994. In 1998 Parliament enacted National Institute of Pharmaceutical Education Act, 1998. The first batch of students was admitted in 1998. NIPER was declared as a “Institute of National Importance” under the Act of Parliament on 26th June 1998. NIPER is a member of Association of Indian Universities.

The main objectives of the Institute are:

1. The main objective of the Institute to nurture and promote quality and excellence in pharmaceutical education & research.
2. Toning up the level of pharmaceutical education and research by training the future teachers, research scientists and managers for the industry and profession.
3. Creation of National Centers to cater to the needs of the pharmaceutical industry and other research and teaching institutes.
4. Collaboration with Indian industry to help it meet global challenges.
5. National/International collaborative research.
6. Study of sociological aspects of drug use and abuse and rural pharmacy etc.
7. Running programmes in drug surveillance, community pharmacy and pharmaceutical management.
- 8.

NIPER has One Centre and 9 Departments :-

- | | |
|------------------------------|------------------------------|
| 1. Medicinal Chemistry | 2. Pharmaceutics |
| 3. Natural Products | 4. Pharmacology & Toxicology |
| 5. Pharmaceutical Analysis | 6. Biotechnology |
| 7. Pharmaceutical Technology | 8. Pharmacy Practice |
| 9. Pharmaceutical Management | 10. Pharmacoinformatics |

Disciplines:

NIPER offers **Master's and Ph.D. degrees** in 14 streams and caters to the needs of pharmaceutical industry:

1. Medicinal Chemistry
2. Natural Products
3. Traditional Medicine
4. Pharmaceutical Analysis
5. Pharmacology & Toxicology
6. Regulatory Toxicology
7. Pharmaceutical Technology (Biotechnology)
8. Pharmaceutical Technology (Formulations)
9. Pharmaceutical Technology (Bulk Drugs)
10. Pharmaceutics
11. Biotechnology
12. Pharmacy Practice
13. Pharmaco informatics
14. Pharmaceutical Management

NIPER conducts regular education programmes for academia and industry in various disciplines and helps the Indian Pharmaceutical Industry in solving their R&D

related requirements. NIPER has upgraded facilities for achieving highest level of efficiency in imparting education and events.

There are **state-of-art classrooms** with installation of TV panels and laptop systems. The NIPER laboratories are fully equipped with modern equipments that are equivalent to the other laboratories set up in the world. All the available facilities are of international level and standards. A Technology Development Centre has also been set up in the NIPER, Mohali. In addition, there has been significant improvement in research infrastructure as several high value sophisticated instruments have been added which has helped in increased thrust in R&D activities.

The following **central facilities** provide support to the research groups within the Institute as well as from outside:

1. Central Instrument Laboratory
2. Computer Centre
3. Library and Information Centre
4. Central Animal facility
5. National Toxicology Centre (GLP compliant)
6. Technology Development Centre
7. National Bio - availability Centre(WHO accredited)
8. Impurity Profiling & Stability Testing Laboratory
9. Pharmacological & Toxicological Screening Facilities (GLP compliant)

The Institute entered into several **International collaborations** and a number of visitors from abroad and within the country visited the Institute, thus highlighting the ever-rising status of the Institute. NIPER started conducting training programs at the newly established Small and Medium Pharmaceuticals Industry Centre (SMPIC) for Small and Medium Pharmaceuticals industry on the aspects of Good Manufacturing Practices (GMP) and Good Laboratory Practices (GLP), Instrumental analysis and manufacturing of APIs and Formulations. The centre will also provide a focal point to industry academia interaction.

During 2009-10, the Institute has published 88 articles in journals of repute. As on date NIPER has filed 102 patents, out of these 17 patents have been granted. Since the inception of academic programmes Total no. of 955 students have passed out (Masters – 750, MBA-205 & Ph.D. 93). A total of 8 Ph.D. degrees were awarded in 2010. Presently 601 students are studying in NIPER including some foreign nationals.

Seats for admission to P.G. Courses, Ph.D in NIPER, Mohali

NIPER, Mohali has enhanced seats for admission to P.G. Courses and Ph.D from 209 to 356 in 2010.

Courses	Students admitted in year	
	2009	2010
PhD.	19	46
M.S.	147	250
M.B.A.	43	60
Total	209	356

NEW NIPERs

Contact:

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Establishment of New NIPERs:

In terms of the amended National Institute of Pharmaceutical Education and Research (NIPER) Act, 1998, the Government of India has set up six new NIPERs at **Hajipur, Hyderabad, Ahmedabad, Rae Bareli, Guwahati and Kolkata**. New NIPERs will cater to the future demand of the pharmaceutical industry for highly trained man power for continuous growth of the pharmaceuticals sector with increased focus on R&D, particularly after the amendment of Indian Patent Act. At present, new NIPERs are functioning with the assistance of the Mentor Institutes while construction of NIPER Campus is completed.

New NIPERs	Mentor Institute
1. NIPER, Ahmedabad	B.V. Patel Pharmaceutical Education and Research Development (PERD) Centre, Ahmedabad.
2. NIPER, Hajipur	Rajendra Memorial Research Institute of Medical Sciences (RMRIMS), Patna.
3. NIPER, Hyderabad	Indian Institute of Chemical Technology (IICT), Hyderabad.
4. NIPER, Guwahati	Guwahati Medical College and Hospital, Guwahati.
5. NIPER, Kolkata	Indian Institute of Chemical Biology (IICB), Kolkata.
6. NIPER, Rae Bareli	Central Drug Research Institute (CDRI), Lucknow.

Starting of Classes at New NIPERs.

Pursuant to the approval of the Cabinet to the setting up of six new NIPERs, classes were started from the academic Session 2007-08 with the help of Mentor Institutes at Ahmedabad, Hyderabad, Kolkata and Hajipur. The classes were started at NIPER, Guwahati and Rae Bareli in 2008-09.

The students are selected through Common Admission Test conducted by NIPER, SAS Nagar, Mohali in association with these new NIPERs.

An Apex Committee under the chairmanship of Secretary (Pharma) has been formed to oversee the smooth functioning of new NIPERs till the Board of Governors of each new NIPER is formed. Likewise, State level Coordination Committee under the Chairmanship of an officer of the level of Principal Secretary of the concerned State Government has been formed for each NIPER to oversee the functioning of the new NIPERs.

Seats for admission to P.G/Ph.D. Courses in new NIPERs.

Steering Committee for new NIPERs has approved enhancement of seats for admission to PG Courses from 262 to 321. Steering Committee for new NIPERs has approved introduction of PhD Courses in new NIPERs from 2010.

MS (Pharm) course: Stream wise details of seats and subjects.

SN	Name of Institute	Existing Disciplines	Enhanced intake from 2010
2	Ahmedabad	Natural Products, Pharmaceutics, Biotechnology, Pharmaceutical Analysis, Medicinal Chemistry, Pharmacology and Toxicology.	63
3	Guwahati	Pharmacology & Toxicology, Pharmacy Practice.	40
4	Hajipur	Biotechnology, Pharmacy Practice, Pharmacoinformatics.	46
5	Hyderabad	Medicinal Chemistry, Pharmaceutical Analysis, Pharmacology & Toxicology.	75
6	Kolkata	Medicinal Chemistry, Natural Products, Pharmacoinformatics.	50
7	Rae Bareli	Medicinal Chemistry, Pharmaceutics.	35

Recent Achievements of NIPERs

NIPER, Mohali

(General)

1. The Institute has played mother role to all the new NIPERs started in different parts of the country by helping them in variety of ways including centralized admissions.
2. A **Technology Development Centre** has been set up in the NIPER, Mohali.
3. The WHO accredited **National Bioavailability Centre** has been established with support of Deptt. of Science & Technology, Govt. of India, which is one of the two centers of the world to conduct the bio-availability studies.
4. The Institute has also set up the Good Laboratory Practices (GLP) compliant **National Toxicology Centre, National Centre of Pharmacoinformatics, National Centre for Safety Pharmacology and Centre for Nanotechnology** with the support of Department of Science & Technology (DST) under Pharmaceutical Research & Development Support Fund (PRDSF programme).
5. NIPER, Molhali has now started **training programmes for Small and Medium Pharmaceutical industry** on the aspects of Good Manufacturing Practices (GMP) and Good Laboratory Practices (GLP), Instrumental analysis and manufacturing of APIs and Formulations. An important aspect of the training programs is the demonstration in the Technology Development Center (TDC), Central Instrument Laboratory (CIL), and Central Animal Facility (CAF), etc. Separate hands-on training modules are available for High Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), and Atomic Absorption Spectroscopy (AAS).

6. NIPER has more than 1300 publications, most of them in reputed, peer-reviewed, international journals. In 2010, NIPER has filed **22 patents two patents have been granted.**
7. The Plan budget proposal for Rs. 25.23 crores for the year 2010-11 has been submitted to Deptt. of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India out of which Rs. 13.72 crores has already been released.
8. Non-Plan budget proposal of Rs. 32.38 crores has been submitted out of which Rs. 19.04 crores has already released by the Ministry for meeting the expenses for the first quarter for the year 2010-11.
9. New projects, worth Rs. 34,079,200, were sanctioned by various funding agencies to NIPER.

(Research)

1. Neglected diseases

- Proteins specifically involved in the survival of intracellular Mycobacteria have been identified. Their possible use as drug targets in tuberculosis is being evaluated.
- Efforts are on to develop a sensitive fluorescence based screening assay for anti-mycobacterial drug screening.
- Out of a set of about fifty compounds synthesized as potential anti-tubercular agents, eight have shown promising activity (up to 1.56 µg/mL) on subjecting to the in vitro antimycobacterial screening (Microorganism: *Mycobacterium tuberculosis*, H37Rv ATCC 27294).
- 34 potential anti-TB compounds have been found to be active against *Mycobacterium tuberculosis* H37Rv at 6.25 µg/mL (IC99).
- 15 compounds have been tested against an Indian *M. tuberculosis* clinical isolate (LRS-04, resistant to INH) at 6.25µg/mL (IC99), and 3 compounds were inactive.
- Six extracts of 02 Indian medicinal plants were screened for antimycobacterial activity in vitro. Detailed phytochemical investigations on the active extracts

resulted in the characterization of 08 compounds from *A. galanga* and 13 compounds from *C. digyna*.

- A number of compounds have been synthesized which have shown activity against promastigotes of *L. donovani*.
- Using bioinformatics tools and various sequence databases, potential drug targets for trypanosomiasis have been identified.
- Triclosan, at 50 µg/ml (minimal inhibitory concentration; MIC), was observed to be active against both the metronidazole-sensitive and -resistant strains of *T. vaginalis*, demonstrating that triclosan may be a promising potential agent for the treatment and management of human trichomoniasis.
- First report of the *in vivo* antimalarial activity of probenecid (PB) a blood-schizonticidal agent, suggests that it can be used as a new therapeutic agent to reduce dose-related toxicity of Dapsone (DS) component of DS-chlorproguanil, used therapeutically in malaria.
- Several S-containing dihydroartemisinin derivatives have been synthesized by a novel indigenously developed method; two of which were proved to be strongly more active (blood schizontocidal activity) than artemisinin against *P. berghei* in mice.

2. Other diseases

- Five heterocyclic molecules as novel anticancer agents (New Chemical Entities, NCEs) have been discovered for breast, lung, kidney, and colon cancer in cell-based assay, with potency more than that of a clinically used anticancer drug, 5-fluorouracil (5-FU).
- Several medicinal plants have been screened for pancreatic lipase inhibitory activity *in vitro* with an aim to develop anti-obesity agents
- Approximately three hundred samples, both natural and synthetic were prepared and evaluated for anti-HIV activity at NCCS Pune. Several lead molecules have been obtained from this work.
- A few compounds have shown anti-HIV activity in lower micromolar range, the most active compound showing activity at 0.28 mM.

- Nine extracts of three Indian medicinal plants have been screened for COX-1 and COX-2 inhibitory activity and the most active extracts were further tested for anti-inflammatory activity in vivo. Several COX-active natural products have been identified from these plants.
- Pharmacological interventions targeting oxidative stress-PARP pathway have been shown to be effective against diabetic neuropathy.
- The mechanism of neuroprotective effect of melatonin and resveratrol in diabetic neuropathy has been worked out.
- A series of synthetic peptide analogs based on Trp-His and His-Arg structural frameworks have been prepared and found to be highly active against several Gram-negative and Gram-positive bacterial strains as well as against a fungal strain with MIC values of the most potent structures in the range of 5-20 µg/mL ((IC₅₀ in the range of 1-5 mg/mL).

3. Drug development and formulation

- Pre-formulation profiling of NP 647, from NIPER's discovery pipeline, to enable development of its oral delivery form.
- Development of a platform technology for generating nano-crystals
- Technologies have been developed for optimizing delivery of BCS class II and IV APIs.
- Human bio-availability studies of previously developed 'self nano emulsifying drug delivery system', has confirmed its oral bioavailability advantage.
- Two formulations have been successfully developed, viz. 1) Nanopolymersome based amphotericin B formulation (PAMBO) and 2) Paromomycin loaded microspheres for Leishmaniasis. The possibility for clinical trials is being explored.

4. Other Researches

- The plants have been identified which accumulate shikimic acid naturally in the aerial parts and methods have been developed for the extraction of shikimic acid. These are being tested on pilot scale for its commercial applications.
- Arishtas, which are fermented Ayurvedic formulations, have been standardized

- Standardization and quality control of herbal drugs and formulations
- Degradation chemistry of at least ten generic drug molecules have been completed during the period.
- Metabolite identification studies on all the four first-line anti-TB drugs using advanced coupled techniques, like LC-MS/TOF and LC-MSⁿ, have been completed.
- A strategy by which human therapeutic proteins can be over expressed in bacterial systems without the formation of non-functional aggregates has been developed

(Others)

1. The following **awards** have been granted to the Institute:
 - a. Pharma-Bio Award 2009 for achievement in (R&D) –Academic Inst.
 - b. ISCB award for excellence for Chemical & Biological science and drug research.
 - c. ICMR Shakuntala Amir Chand Prize for significant contribution in biomedical research for Bio Medical Research
 - d. OPPI Scientific Award for Advance research in Medicinal Chem.
 - e. OPPI Young Scientist Award for Advance research in pharmaceuticals (novel and improved drug delivery system)
 - f. Ranbaxy Research Award for Pharmaceutical Sciences.
 - g. Received award for best research paper (in Hindi) at the National Scientific and Technical Conference, organized by TBRL Chandigarh.
2. The following **Events** were conducted by the Institute:
 - a. The 2nd biennial conference on Drug Discovery from Natural Products and Traditional Medicines (Nov 20-24, 2010).
 - b. Workshop on Advanced Analytical Techniques under ITEC/SCAAP programme (Oct-18-30, 2010)
 - c. Visit of Scottish Higher Education team (Oct. 6, 2010)
 - d. Inauguration of Community Centre by Shri Mukul Joshi, Secretary, DoP (Oct. 4, 2010)
 - e. Visit of Russian Team headed by the Trade Minister (Sept 30, 2010)
 - f. 3rd Summer School on Nanotechnology in Advanced Drug Delivery (Aug 23-27, 2010)

(Photographs NIPER, Mohali)



Inauguration of 2nd biennial conference on Drug Discovery from Natural Products and Traditional Medicines (Nov. 20-24, 2010)



Inauguration of workshop on Advanced Analytical Techniques, organized under ITEC/SCAAP programme (Oct. 18-30, 2010)



Visit of Scottish Higher Education team (Oct. 6, 2010)



Inauguration of 3rd Summer school on Nanotechnology in Advanced Drug Delivery (Aug. 23-27, 2010)

NIPER, Ahmedabad:

- a. Three new courses has been introduced in NIPER, Ahmedabad in the year 2010-11 namely Pharmaceutical Analysis, Medicinal Chemistry, Pharmacology and Toxicology.
- b. Two batches of M. S. (Pharm.) students have successfully passed out with 98% placement.

- c. NIPER students won 2 first prizes, 1 second prize and 1 third prize for their presentations of paper in various national conferences and seminars.
- d. Since the inception NIPER, Ahmedabad has published 11 important research papers in national and international journals.

NIPER, Kolkata:

NIPER-Kolkata was inaugurated on November 05, 2007. Since its inception the Institute has been conducting Masters' level programmes in three different disciplines, Medicinal Chemistry, Natural Products and Pharmacoinformatics, leading to M.S. (Pharm.) degree.

Allotment of land for NIPER-Kolkata

NIPER-Kolkata has received the certificate of possession of land from the State Govt. of West Bengal for the construction of independent campus. The physical possession of the land is expected to be handed over soon.

First annual convocation of NIPER-Kolkata

The first annual convocation of NIPER, Kolkata was held on Friday the 11th June, 2010 in the premises of Indian Institute of Chemical Biology, Jadavpur, Kolkata. The convocation was presided over by Sri Ashok Kumar, Secretary, Department of Pharmaceuticals, Govt. of India & Chairman, Steering Committee of NIPER-Kolkata and Prof. Samir K. Brahmachari; Director General, Council of Scientific & Industrial Research (CSIR) was the Guest-in-Chief.

Admission of students in 2010-2011

Counseling for admission of students took place in NIPER-Mohali in the month of July, 2010. The orientation programme for the students took place on 5th August, 2010 and the classes commenced from 6th August, 2010. Discipline wise details are as follows:

Discipline	No. of students
Medicinal Chemistry	18
Natural Products	18
Pharmacoinformatics	14

Academic Achievement

- 32 Masters Students of the second batch graduated in June, 2010. Of them twenty nine graduates have been absorbed in the Industries, Colleges and Research institutes. Placement was achieved for these students according to their options for employment in companies as well as in centers for teaching and higher studies.
- Ms. Neha Trivedi, a Pharmacoinformatics student of the third batch, qualified for CSIR JRF in the NET examination held in June, 2010 securing the 42nd rank.
- A total of 371 books have been purchased by NIPER-Kolkata. The Institute subscribes for SciFinder.

(Photographs NIPER, Kolkata)



Chemistry Lab, NIPER, Kolkata



First Convocation, NIPER, Kolkata

New Initiatives of NIPER Division

Setting up Good Laboratory Practices (GLP) Compliant Chemical, Biological Laboratories and Large Animal Facilities

The Department plans to set up Good Laboratory Practices (GLP) Compliant, Chemical Laboratories, Biological Laboratories and Large Animal Facilities in PPP Mode. Though with the approval of Planning Commission, the applications were invited for setting up these facilities in PPP Mode, yet these could not be sanctioned finally due to technical problems. The Department has since set up a Committee comprising scientists of NIPERs to assess the requirements vis-à-vis availability of these facilities in the country and indicate the gaps so that the schemes could be prepared accordingly. The Committee would also look into and indicate whether these facilities could be operated in a viable manner in PPP Mode.

Collaborative TB Research Project Proposal of NIPER, Ahmedabad

The project aims at “Development and Clinical evaluation of novel fixed dose combination of rifampicin and isoniazid designed to improve stability and bioavailability of rifampicin for the treatment of tuberculosis”. The project is in collaboration with All India Institute of Medical Sciences (AIIMS), New Delhi.

National Centre for Research & Development in Drugs at NIPER, Hyderabad –

It is proposed to set up a National Centre for R&D in bulk drugs at Hyderabad. NIPER, Hyderabad has since assigned the Consultancy to Deloitte for preparing DPR for setting up the Centre. The final report from Deloitte is expected soon on receipt further action will be taken to secure approval of the competent authority.

The Centre would aim at development of technologies and process for cost competitiveness, environmental impact management, risk management and development of safety in manufacturing operations, knowledge transfer platform between industry and academia.

The research avenues for bulk drugs are: Drugs process innovation, Drug discovery and development, Analytical chemistry, Process engineering, cleaner technology, Polymorphism, Nanotechnology etc.

Medical Devices & Equipment Park at Ahmedabad

Medical Devices and Equipment Park is proposed to be set up by NIPER, Ahmedabad in partnership with the State Government of Gujarat. The in principle approval was accorded by the Planning Commission. EFC recommended the proposal for approval. It is awaiting the approval of the competent authority.

National Centre for Medical Devices at NIPER, Ahmedabad

The proposal has been received from NIPER, Ahmedabad for setting up National Centre for Medical Devices (NCMD) in order to provide academic R&D and evaluation facilities to medical devices industry for new products development and assessment for the medical devices products. The focus areas would be Dental, Heart, Orthopaedic and Ophthalmic. The proposal is proposed to be sent to the Planning Commission after seeking concurrence of the IFD.

Awareness Programme on Environment and Hazard Management in Pharmaceuticals Sector in India.

An awareness programme was held on Environment and Hazard Management in Pharmaceuticals Sector in India at Hyderabad in collaboration with GTZ and FICCI on 12th November 2010. The programme aimed at bringing awareness to pharmaceuticals industry on various aspects of environment and hazard management and to facilitate interaction among stakeholders, viz. government organizations, industry, experts and service providers. The Awareness Programme provided a platform for exchange of information and technical know-how to the Indian pharmaceutical & bulk drug in identifying problem and assessing existing gaps, and finding solution to reduce the associated hazards and environmental risks.
