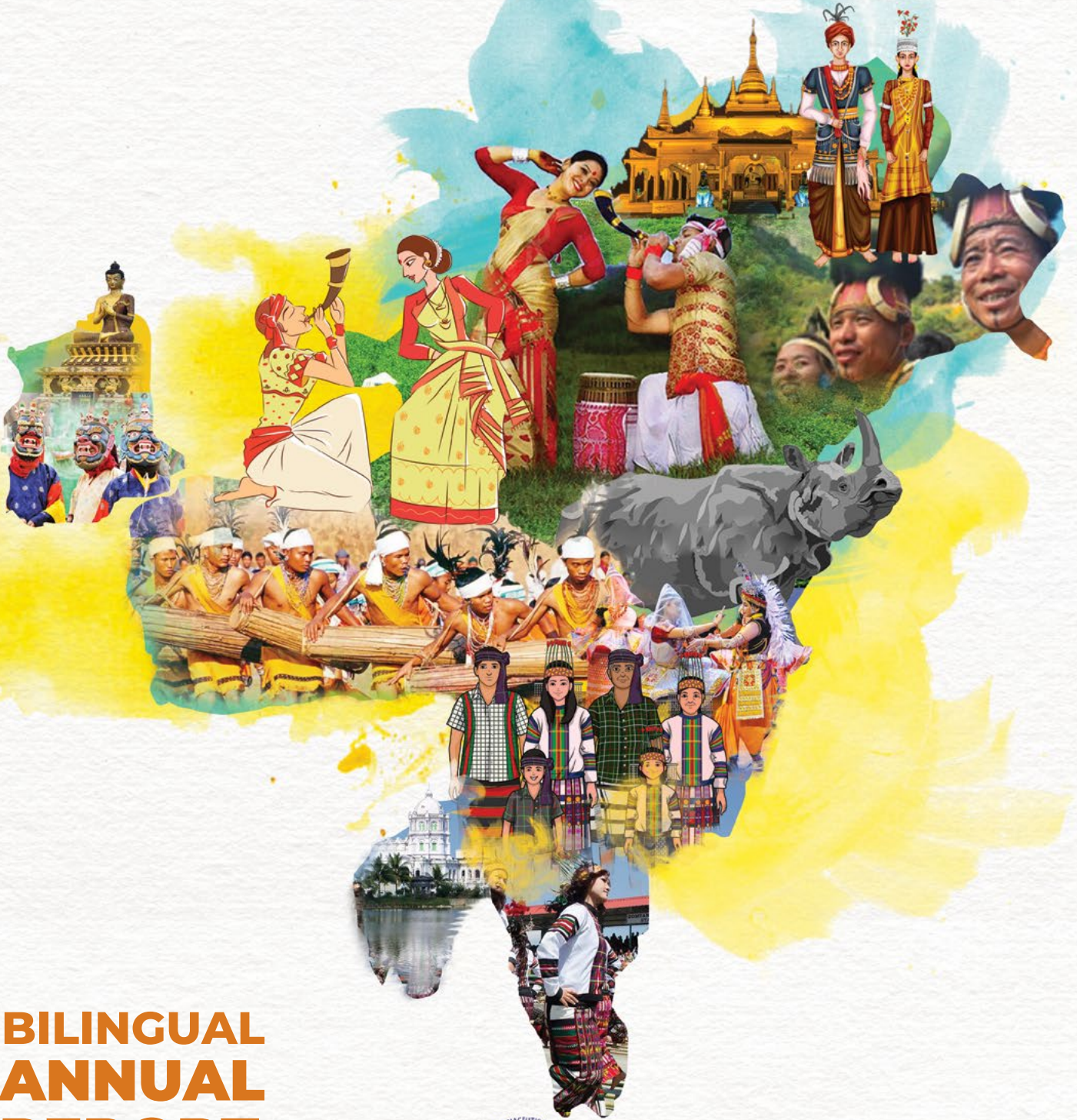


वार्षिक विवरण तथा
वित्त खातों का वार्षिक विवरण
2020-2021



Annual Report
and
Annual Statement of Accounts
2020-2021



**BILINGUAL
ANNUAL
REPORT**
2020-2021



राष्ट्रीय औषधीय शिक्षा एवं अनुसंधान संस्थान, गुवाहाटी
National Institute of Pharmaceutical Education and Research, Guwahati
Dept. of Pharmaceuticals, Min. of Chemicals & Fertilizers, Govt. of India
Sila Village, Nizsundarighopa, Changsari, Kamrup (R), Guwahati-781101, Assam



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From Director's Desk



Warm greetings to all on behalf of National Institute of Pharmaceutical Education and Research (NIPER) Guwahati. The financial year of 2020-21 has been a significant year for the institute in terms of education, research as well as academic collaboration which have contributed immensely to place the institute in the global platform. As the world was fighting against the Covid-19 pandemic during these challenging times, NIPER Guwahati played its role efficiently by devising 3D-printed hands-free objects and 3D-printed face shields for the common masses; an initiative which was well received and applauded by then ministry of health Govt Assam when the products were handed over for its usage in the state. During this time, another 3D printed medicated skin patch was developed by our researchers and was granted patent from Indian Patent Office for 20 years. This innovation offers feasible TB therapeutic solutions which may prove to be crucial for the population from Northeast as they are often seen as comparatively more susceptible to Tuberculosis.

A major highlight of the FY 2020-21 was shifting of the

institute to its permanent campus at Changsari amidst the lush green hilly landscape and a place of immense natural beauty. Signing of a number of important MoUs with several prestigious institutions such as Daicel Chiral Technology, AMTZ, KIIT-TBI Incubation Centre, National Dope Testing Laboratory, Central Council of Homoeopathy, Hindustan Antibiotics Limited etc marked one of the most important highlights of the year. Of these, MoUs signed with IBSD (DBT Govt India) Imphal and AIIMS Jodhpur for mutually beneficial research collaboration in the field of multidisciplinary educational, scientific, and technological areas will be proven vital in the pharma research sector.

We have successfully expanded our list of approved national centres this year, adding 5 more important centres which takes the tally up to 8. These are, (1) GMP accredited Pilot Scale Extraction Facility for the development of Phytopharmaceutical products from the medicinal plants of Northeast India, funded by Dept of Biotechnology, Govt. of India, (2) Adverse Drug Reaction Monitoring Centre, funded by Ministry of Health and Family Welfare, Govt of India, (3) Advance Centre for Computer-Aided Drug Design (ACAD), funded by Ministry of Electronics and Information Technology, Govt of India, (4) Animal Breeding Centre & GLP accredited Biological Screening and Toxicology Centre, funded by Ministry of DoNER, Govt. of India, and (5) Quality Assurance and Value Addition Centre for Herbal Industry in the North-eastern states of India, funded by Ministry of Commerce under TIES scheme, Govt of India.

With the growth of the institute moving in its projected path, I can only envision a great future for NIPER Guwahati where it stands out among the world leaders of pharmaceutical research and education and become a torch bearer. I look forward to integrating our students, faculty and staff members as well as our well-wishers and partners and unitedly work towards academic excellence.

Dr. USN Murty
Director

Board of Governors of NIPER-Guwahati



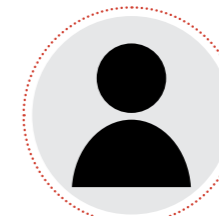
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Shri Nabajit Boro
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Dr. M.U.R. Naidu
Member – Pharmaceutical
Industrialist
Director, NATCO
Hyderabad



Dr. Krishna Prasad
Member – Pharmaceutical
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Director, Pfizer Ltd.

Advisory Members



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Academic Planning and Development Committee (APDC)

vide section 3.3.1.1 (d) of NIPER Statute



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ABOUT NIPER GUWAHATI



The National Institute of Pharmaceutical Education & Research (NIPER) has been established under the aegis of the Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Govt. of India, as a Center of Excellence in several parts of the country for imparting higher education, research and development in the pharmaceutical sciences sector. As per the notification issued by the Govt. of India on 26th June 1998, NIPER was declared as an 'Institute of National Importance' through an Act of Parliament. NIPER Guwahati is the fifth institute among seven NIPERs which started functioning from the month of September of 2008 under the mentorship of Gauhati Medical College and Hospital in Guwahati (Assam). In the same year, NIPER Guwahati set out its journey by offering admission to students in two Post Graduate courses viz. M.S.(Pharm) in Pharmacology & Toxicology and M. Pharm in Pharmacy Practice. In 2010, NIPER Guwahati introduced the M.S. (Pharm) programme in Biotechnology.

The doctoral degree programme of NIPER Guwahati was introduced in 2011 with Ph.D. in the Department of Pharmacology & Toxicology. Later, the Ph.D. programmes were expanded to Department of Biotechnology and Department of Pharmacy Practice in the years 2014 and 2015 respectively. In 2018, two more departments viz. Department of Pharmaceutics and Department of Pharmaceutical Analysis were added which gave opportunities to students to pursue their studies in M.S.(Pharm) and Ph.D. programmes. Recently in the year 2021, the institute has also begun offering M.S.(Pharm) and Ph.D. courses in the newly introduced Department of Pharmaceutical Technology (Formulations) and Department of Medicinal Chemistry, in addition to M.Tech and Ph.D programmes in Department of Medical Devices as well.

NIPER Guwahati currently boasts eight National Centers funded by various ministries of Govt. of India.

Sl. No.	Name of the National Centers at NIPER Guwahati	Funding Agency
1	BioNEST-Incubation Centre	BIRAC-DBT, Gol.
2	NCPE (National Centre for Pharmacoengineering)	DPRP-DST, Gol.
3	GMP-accredited Pilot Scale extraction facilities	DBT, Gol
4	QA & Value addition Centre for Herbal Industry	TIES, MoC, Gol
5	'ADR Monitoring Centre, PvPI, IPC	MoHFw, Gol
6	Advanced Centre For Drug Design	MeiTY, Gol
7	GLP-accredited Animal facility National Centre for Animal Breeding	DoNER, Gol.
8	Centre of Excellence in Tribal health	Min. of Tribal Affairs, Gol.

NIPER Guwahati encourages its faculty members to pursue sponsored research of high relevance to pharmaceutical industry and offers industrial consultancy services to further strengthen the bonds with the pharmaceutical industries.

VISION

To be an institution of excellence in promoting high standard pharmaceutical education & research through the dissemination of knowledge for the ultimate benefit of the society and pharmaceutical industries.



MISSION

- Toning up the level of pharmaceutical education and research by training the future teachers, research scientists and managers for the pharmaceutical industry.
- To carry out world class innovative research in Pharmaceutical Sciences.
- To cater the needs of pharmaceutical industry and other research.
- Study of sociological aspects of drug use and rural pharmacy.
- To be one of the principal sources of professional manpower in the field of pharmaceutical and related sectors.

Functional Committees

Purchase Committee

- **Dr. Hemant Kumar Srivastava**
Associate Professor- Chairman
- **Dr. VGM Naidu**
Associate Professor & Director's Nominee
- **Dr. RadhaKrishnanand**
Associate Professor- Member
- **Dr. Subham Banerjee**
Asst. Professor- Member
- **Dr. Ramu Adela**
Asst. Professor- Member
- **Mr. Ashit Biswas**
FAO-Member
- **Mr. I.K.Bania**
Purchase Officer-Member

Local Purchase Committee

- **Dr. Hemant Kumar Srivastava**
Associate Professor, Chairman
- **Mr. Gitartha Goswami**
Asst. Registrar- Member
- **Mr. Sumon Choudhury**
System Engineer-Member

Library Committee

- **Dr. VGM Naidu**
Dean - Chairman
- **Dr. Amit Alexander**
Assoc. Professor-Member
- **Dr. Hemant Kumar Srivastava**
Associate Professor, Member
- **Dr. Bidya Dhar Sahu**
Asst. Professor- Member
- **Dr. SudhagarSelvaraj**
Asst. Professor-Member
- **Dr. Ramu Adela**
Asst. Professor-Member
- **Dr. Roshan Borkar**
Asst. Professor - Member
- **Mr. Srikanta Shu**
Library & Information Officer - Member

Internal Finance Committee

- **Dr USN Murty**
Director, NIPER-Guwahati
- Dy. Secretary, IFD, DoP, Gol - Member
- **Dr. Rambhau**
Director, Pulse Pharmaceuticals, Hyderabad
- **Dr. N. C. Talukdar**
Former Director, IASST, Guwahati - Member
- **Dr. Pakshirajan**
Professor, IIT-G - Member
- **Dr. VGM Naidu,**
Associate Professor & Dean - Member
- **Mr. Ashit Biswas**
FAO-Member
- **Mr.P. K. Bhujbal**
Registrar -Member

Functional Committees

Placement Committee

- **Dr. P. Radhakrishnanand**
Assoc. Professor-Chairman
- **Dr. VGM Naidu**
Associate Professor & Director's Nominee
- **Dr. Amit Alexander**
Assoc. Professor-Member
- **Dr. Bidya Dhar Sahu**
Asst. Professor- Member
- **Dr. SudhagarSelvaraj**
Asst. Professor-Member
- **Dr. Kalyan Kr. Sethi**
Asst. Professor-Member
- **Dr. Krishna Undela**
Asst. Professor-Member
- **Dr. Ratan J. Lihite**
GHHS-Member

Building Construction Monitoring Committee

- **Dr. USN Murthy**
Chairman, Director (Finance/Dy. Finance Advisor) DoC&P, GoI
- **Dr. VGM Naidu**
Associate Professor & Dean
- **Dr. Hemanth Kumar Srivastava**
Associate Professor
- **Dr. Bipul Talukdar**
Asso. Prof. AEC
- **Dr. Arun Borsaikia**
Technical Eng. IITG
- **Mr. Prashant K. Bhujbal**
Member Secretary

Functional Committees

Internal Complaint Committee for Sexual Harassment of Women at Workplace

- **Dr. Sonali Roy**
Incubation Mgr. - In-charge
- **Dr. VGM Naidu**
Associate Professor & Director's Nominee
- **Mrs. Swapna Devi M**
Secy. to Director - Member
- **Dr. Roshan Borkar**
Asst. Professor - Member
- **Ms. Poonam**
Ph.D Scholar, Dept. of Biotechnology - Student Representative
- **Mr. Diganta Gogoi**
Lawyer
- **Mr. P. K. Bhujbal**
Registrar -Member

Environment and Safety Committee

- **Dr. Sanjay K. Banerjee**
Assoc. Professor - Chairman
- **Dr. VGM Naidu**
Associate Professor & Director's Nominee
- **Dr. Hemant Kumar Srivastava**
Assoc. Professor - Member
- **Dr. Bidya Dhar Sahu**
Asstt. Professor -Member
- **Dr. Pawan Kumar Porwal**
Asstt. Professor- Member
- **Dr. Krishna Undela**
Asstt. Professor-Member
- **Mr. P. K. Bhujbal**
Registrar -Member

Canteen Management & Hostel Committee

- **Dr. Sanjay K. Banerjee**
Assoc. Professor- Chairman
- **Dr. VGM Naidu**
Associate Professor & Director's Nominee
- **Dr. Amit Alexander**
Assoc. Professor-Member
- **Dr. Ramu Adela**
Asstt. Professor- Member
- **Dr. Sudhagar Selvaraj**
Asst. Professor-Member
- **Dr. Ratan J. Lihite**
GHHS-Member
- **Mrs. Swapna Devi**
Secretary to Director-Member

Guest Faculty

- **Dr. Ramakrishna Sistla**
CSIR-IICT Hyderabad
- **Dr. Harinarayana Rao**
CDFD, Hyderabad
- **Dr. Ajay Kunnumakkara**
IIT Guwahati
- **Dr. Ramesh Aiyagari**
IIT Guwahati
- **Dr. Vinod Tiwari**
IIT Varanasi
- **Dr. Pritam Mohan**
CVSc, Khanapara, Ghy
- **Dr. Chandana C Baruah**
CVSc, Khanapara, Ghy
- **Dr. Munmee Das**
Govt. Ayurvedic College,
Guwahati
- **Dr. Nagendra Nath Barman**
CVSc, Khanapara, Ghy
- **Dr. Pankaj Deka**
CVSc, Khanapara, Ghy
- **Dr. Bikash Medhi**
PGIMER, Chandigarh
- **Dr. Pawan Sharma**
Thomas Jefferson University
- **Dr. Gautam Sethi**
Yong Loo Lin School of
Medicine, NUS, Singapore
- **Prof. UN Das**
UND Life Sciences, USA
- **Dr. Saber Hussain**
US Air Force Research Lab,
Dayton, OH
- **Prof Hari S. Sharma**
Institute of Cardiovascular
Research, Netherland
- **Dr. Senthil Kumar**
IIT Guwahati
- **Dr. Bhabatosh Das**
Translational Health Science
and Technology Institute,
Haryana
- **Dr. Arvind Kumar**
CSIR-CCMB, Hyderabad
- **Dr. Soumen K Maiti**
IIT Guwahati
- **Prof. Tharmalingam
Punniyamurthy**
IIT Guwahati
- **Dr. Pavan K Kancharla**
IIT Guwahati
- **Dr. Akshai Kumar**
IIT Guwahati
- **Dr. Samuel De Visser**
Manchester Institute of
Biotechnology
- **Dr. Etienne Derat**
Sorbonne University, Paris
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- **Prof. Claudiu T. Supuran**
University of Florence, Italy
- **Dr. Fabrizio Carta**
University of Florence
- **Dr. R. K. Paul**
Pratiksha Hospital
- **Dr. Rupam Das**
Dr. Rupam's Diabetes and
Foodcare Guwahati
- **Dr. Rajeev Arab**
Rheumatologist, Private
Practice
- **Dr. MousumiBorthakur**
GNRC, North Guwahati
- **Dr. NJ Barkataky**
Hayat Hospital, Guwahati
- **Dr. Nahid Islam**
GNRC Hospital, Guwahati
- **Dr. PP Kalita**
GNRC Hospital, Ghy
- **Dr. MUR Naidu**
Natco Pharma, Hyderabad
- **KG Ravi Kumar**
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- **Dr. SK Maulik**
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- **Dr. Himangsu Patel**
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- **Dr. Giovanni Ferrara**
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- **Dr. B. Narender**
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- **Dr. Rajeev Arab**
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- **Dr. Gayatri Vishwakarma**
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- **Prof. SokoSetaguchi**
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School and Rutgers School of
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- **Dr. Sunil Kumar Dubey**
Birla Institute of Technology
& Science, Pilani
- **Dr. Arvind Dixit**
Ascent Pharma
- **Ms. Suravi Jain**
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- **Dr. Srimannarayana**
AET Laboratories, Hyderabad
- **Dr. S. Kanagraj**
IIT Guwahati
- **Dr. Sumit Dutta**
IIT Guwahati
- **Dr. Utpal Bora**
IIT Guwahati
- **Dr. Sajan Kapil**
IIT Guwahati
- **Dr. Jagat Baruah**
IASST, Guwahati
- **Dr. Dilip Dutta**
FAAMC, Barpeta, Assam
- **Interdisciplinary Guest
Speaker**
- **Dr. Pradeep Agnihotri**
Nectar Lifesciences Ltd
- **Dr. Pradip Majumder**
Accuris Therapeutics
- **Dr. Sharad Sharma**
Baxter Pharmaceuticals India
Pvt. Ltd

Details of Courses, Disciplines & Intake

Programme	Discipline	Intake	Admitted
M.S.(Pharm.)	Biotechnology	10	10
	Pharmacology & Toxicology	15	15
	Pharmaceutical Analysis	19	19
	Pharmaceutics	18	18
	Medicinal Chemistry	11	11
M. Pharm	Pharmacy Practice	10	10
	Pharmaceutical Technology (Formulation)	11	11
M.Tech	Medical Devices	10	9
Total M/M.S. Students		104	103
Ph.D. (DoP Sponsored)	Biotechnology	02	02
	Pharmacology & Toxicology	02	02
	Pharmaceutical Analysis	02	02
	Pharmaceutics	04	04
	Medicinal Chemistry	02	02
	Pharmacy Practice	01	01
Total Ph.D. Students		13	13
Ph.D. (Under Project)	Pharmaceutical Analysis	-	01
	Pharmaceutics	-	01
	Pharmacy Practice	-	01
Total Ph.D. Students		-	03
Grand Total (Masters & Ph.D.)			119



Details of the Ph.D. Students (Session: 2020-21)

Department of Biotechnology

Batch 2020	Student Name	Registration No	Funding Agency
	Bidisha Biswas	BT/2020-6/007/Ph.D.	DoP
	Vikash Tiwari	BT/2020-6/008/Ph.D.	DoP

Department of Pharmacology & Toxicology

Batch 2020	Student Name	Registration No	Funding Agency
	Bishal Rajdev	PC/2020-11/026/Ph.D.	DoP
	Uttam Kulhari	PC/2020-11/027/Ph.D.	DoP

Department of Pharmaceutical Analysis

Batch 2020	Student Name	Registration No	Funding Agency
	V V S Prasanna Kumari Rayala	PA/2020-3/004/Ph.D.	DoP
	Dimple Sunil Kumar Lalchandani	PA/2020-3/005/Ph.D.	DoP
	Sachin Datram Pawar	PA/2020-3/006/Ph.D.	Project

Department of Pharmaceutics

Batch 2020	Student Name	Registration No	Funding Agency
	Pravakaran A	PE/2020-3/007/Ph.D.	DoP
	Amruta Prabhakar Padakanti	PE/2020-3/008/Ph.D.	DoP
	Mithun Rajendra Dethe	PE/2020-3/009/Ph.D.	DoP
	Tukaram Ram Karanwad	PE/2020-3/010/Ph.D.	DoP
	Syed Nazrin Ruhina Rahman	PE/2020-3/011/Ph.D.	Project

Department of Medicinal Chemistry

Batch 2020	Student Name	Registration No	Funding Agency
	Bhakti Umesh Hirlekar	MC/2020-1/001/Ph.D.	DoP
	KM Abha Mishra	MC/2020-1/002/Ph.D.	DoP

Department of Pharmacy Practice

Batch 2020	Student Name	Registration No	Funding Agency
	Christy Thomas	PP/2020-6/006/Ph.D	DoP
	Bishamber Nath	PP/2020-6/007/Ph.D	Project

Students Admitted (2020-21)

Department of Pharmacology & Toxicology Programme: M.S. (Pharm.)

Batch 2020	Student Name	Registration No
	Sri Vathsan	PC/2020-13/210
	Arun N	PC/2020-13/211
	Neethu Prasad	PC/2020-13/212
	SaumyaRanjanBadajena	PC/2020-13/213
	Vishal Balu Chaudhari	PC/2020-13/214
	Anirban Barik	PC/2020-13/215
	Vinay Mahendra Paliwal	PC/2020-13/216
	Nikhil Vinayak Phatak	PC/2020-13/217
	Prathamesh Mahadev Patil	PC/2020-13/218
	Vamsi Priya Vikram	PC/2020-13/219
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	Vitthal Venkatrao Gopnar	PC/2020-13/221
	Lakshmi Tulasi Narahariseti	PC/2020-13/222
	Shubhang Manaharlal Joshi	PC/2020-13/223
	Ritish Goyal	PC/2020-13/224

Department of Pharmacy Practice Programme: M. Pharm.

Batch 2020	Student Name	Registration No
	Asif Muhammed	PP/2020-13/103
	RanjaniDurga Devarapalli	PP/2020-13/104
	GiftyLawrance	PP/2020-13/105
	Amol Laxman Hirke	PP/2020-13/106
	UjwalaBhashkarRamteke	PP/2020-13/106 (not joined)
	Karun Donthineni	PP/2020-13/108
	Amar Ashok Maske	PP/2020-13/109
	Shruti Rajesh Varade	PP/2020-13/110
	Nethravathi Golla	PP/2020-13/111
	Pravallika Mudimala	PP/2020-13/112

Students Admitted (2020-21)

Department of Biotechnology Programme: M.S. (Pharm.)

Student Name	Registration No
Sridivya Goud Kalali	BT/2020-11/087
Rekha Pothuganti	BT/2020-11/088
Pradeep Kumar Patel	BT/2020-11/089
Shriram Arvind Mahajan	BT/2020-11/090
Madhavi Manohar Bhatia	BT/2020-11/091
Anam Ismail Pathan	BT/2020-11/092 (discontinued)
Satyajit Laxman Murkute	BT/2020-11/093
Balaji Sanjay Somwanshi	BT/2020-11/094
Malsawm Zuali Jongte	BT/2020-11/095 (discontinued)
Subhashith Bhattar	BT/2020-11/096

Department of Pharmaceutical Analysis Programme: M.S. (Pharm.)

Student Name	Registration No
SanketYashawantGawas	PA/2020-3/035
Sandeep Jat	PA/2020-3/036
Bharani Sai Venkatesh Karri	PA/2020-3/037
Anjana Elsa Viju	PA/2020-3/038
Rajashekar Reddy Renna	PA/2020-3/039
Sourabh Chouhan	PA/2020-3/040
RaheemaKhatoon	PA/2020-3/041
Nasir Khan	PA/2020-3/042
Prachi PremanandVernekar	PA/2020-3/043
Abhishek Gupta	PA/2020-3/044
MahindranM	PA/2020-3/045
PravallikaKommuri	PA/2020-3/046
RamakantaPatel	PA/2020-3/047
Vamsi Barre	PA/2020-3/048
Aditya Sharma	PA/2020-3/049
HemalathaSatam	PA/2020-3/050
Kashyap AjaybhaiTrivedi	PA/2020-3/051
Omkar Sandeep Londhe	PA/2020-3/052
Ajay Sabbavarapu	PA/2020-3/053

Students Admitted (2020-21)

Department of Pharmaceutics Programme: M.S. (Pharm.)

Student Name	Registration No
Chandra Lekha Putta	PE/2020-3/034
Adinath Arun Dadhale	PE/2020-3/035
Sourabh Sunil Jadhav	PE/2020-3/036
Shikha Shambhunath Jha	PE/2020-3/037
Mayur Sudam Khule	PE/2020-3/038
Klaudi K Vaiphei	PE/2020-3/039
Naitik Himanshu Jariwala	PE/2020-3/040
Nidhi Malviya	PE/2020-3/041
Manasi Uday Umarji	PE/2020-3/042
Sourav Vimalkumar Chougule	PE/2020-3/043
Ketki Umesh Gatade	PE/2020-3/044
Sri Lakshmi Ramya Kotha	PE/2020-3/045
Rohit Dattatray Bhawale	PE/2020-3/046
Srushti Sanjay Lekurwale	PE/2020-3/047
Sudarshan Naidu Chilamakuri	PE/2020-3/048
Amit Ravindra Pariskar	PE/2020-3/049
Atul Sayaji Kamble	PE/2020-3/050
Sumedh Devrao Bahadure	PE/2020-3/051

Department of Medicinal Chemistry Programme: M.S. (Pharm.)

Student Name	Registration No
Monika Kapildev Verma	MC/2020-1/001
Amrutha Cica Tomy	MC/2020-1/002
Hrushikesh Shesharao Chaudhari	MC/2020-1/003
Omkar Sharad Palkar	MC/2020-1/004
Mayur Arun Pawar	MC/2020-1/005
Sanjana Roychowdhury	MC/2020-1/006
Abraroddin Mumtajoddin Khatib	MC/2020-1/007
Runesh Podili	MC/2020-1/008
Ashru Ajinath Kate	MC/2020-1/009
Teja Sree Pathlavath	MC/2020-1/010
Kanchan Madanrao Wagh	MC/2020-1/011

Students Admitted (2020-21)

Department of Pharmaceutical Technology (Formulation) Programme: M. Pharm.

Batch 2020	Student Name	Registration No
	ManniniBhatt	PTF/2020-1/001
	Komal Vijay Gawali	PTF/2020-1/002
	K TejaswiniKolipaka	PTF/2020-1/003
	Swati Kailas Gore	PTF/2020-1/004
	Dnyaneshwar Madhukar Patil	PTF/2020-1/005
	Pravin Parmeshwar Kamble	PTF/2020-1/006
	Shital Sunil Ranvare	PTF/2020-1/007
	Gopal Dnyanba Bajad	PTF/2020-1/008
	Ravikiran Ramesh Kshirsagar	PTF/2020-1/009
	Naveen Kumar Kolagani	PTF/2020-1/010
Vivek Aravind Phatale	PTF/2020-1/011	

Department of Medical Devices Programme: M. Tech.

Batch 2020	Student Name	Registration No
	KanchaShirisha	MD/2020-1/001
	BankarNutanRavindra	MD/2020-1/002
	LambateManasi Anand	MD/2020-1/003
	Pansare Mayuri Madhav	MD/2020-1/004
	Bagul Harshali Kailas	MD/2020-1/005
	Sangam Vandana Shankar	MD/2020-1/006
	Phalke Purva Suhas	MD/2020-1/007
	Arasavelli Sukanya	MD/2020-1/008
	Ghugare Pragati Siddharth	MD/2020-1/009

List of Students Passed (Session: 2019-21)

Department of Pharmacy Practice Programme: M. Pharm.

Batch 2019	Student Name	Registration No
	Hibathulla P	PP/2019-12/093
	Saphal Surendran	PP/2019-12/094
	Athira S. Joshy	PP/2019-12/095
	Aishwarya T S	PP/2019-12/096
	Rosemol George	PP/2019-12/097
	Gadidala Saikumar	PP/2019-12/098
	J. Jaya Laxmi	PP/2019-12/099
	Kamsuthong W Tikhir	PP/2019-12/101
	G. Sneha	PP/2019-12/102

Department of Pharmacology & Toxicology Programme: M.S. (Pharm.)

Batch 2019	Student Name	Registration No
	Bijoyani Ghosh	PC/2019-12/195
	Shobhit Gairola	PC/2019-12/196
	Yalamarathi Sai Sudha	PC/2019-12/197
	Sourav Kundu	PC/2019-12/198
	Debarati Rakshit	PC/2019-12/199
	Aparajita Ghosh	PC/2019-12/200
	Ankush Kumar Jha	PC/2019-12/201
	Akash Kumar Mourya	PC/2019-12/202
	Sivaswaroop Yarasi	PC/2019-12/203
	Md. Abubakar	PC/2019-12/204
	Kamlesh Ravindra Patil	PC/2019-12/205
	Rajnish Tiwari	PC/2019-12/206
	Anoop S	PC/2019-12/207
	Pote Aniket Balasaheb	PC/2019-12/208
	Pakpi Doye	PC/2019-12/209

List of Students Passed (Session: 2019-21)

Department of Biotechnology Programme: M.S. (Pharm.)

Student Name	Registration No
Prakash Yadnyakant Khandave	BT/2019-10/077
M. Navya	BT/2019-10/078
Uppalapati Sai Swetha	BT/2019-10/079
Vaidehi Sunil Bhavsar	BT/2019-10/080
T. Nandini	BT/2019-10/081
Puppala Vaishnavi	BT/2019-10/082
Komati Bhanu Rekha	BT/2019-10/083
Suchita Shalini	BT/2019-10/084
Nikeeta Das	BT/2019-10/085
Sandra Lalchhuanawmi	BT/2019-10/086

Department of Pharmaceutical Analysis Programme: M.S. (Pharm.)

Student Name	Registration No
Sachin Chaturvedi	PA/2019-2/016
Paritala Sree Teja	PA/2019-2/017
Anandhu K S	PA/2019-2/018
Kondrakunta Kiran Kumar	PA/2019-2/019
Athira Joseph	PA/2019-2/020
Sachin Balasaheb Jorvekar	PA/2019-2/021
Salveru Balashiva	PA/2019-2/023
Vangala Vijay Shivaranga Chary	PA/2019-2/024
Vijay Shivaji Bhalekar	PA/2019-2/025
Atul Kumar Dewangan	PA/2019-2/026
Kailas Adapsing Jatwe	PA/2019-2/027
Devendra Anil Badgujar	PA/2019-2/028
Akula Sai Jyothi	PA/2019-2/029
Shinde Mrunal Sharad	PA/2019-2/030
Pirangi Srikanth	PA/2019-2/031
Banwari Lal	PA/2019-2/032
Waibiangki Lyngdoh	PA/2019-2/033
Chikkondra Aruna	PA/2019-2/034

List of Students Passed (Session: 2019-21)

Department of Pharmaceutics Programme: M.S. (Pharm.)

Student Name	Registration No
Rathod Krushna Dnyaneshwar	PE/2019-2/016
Prashant Bhaskar Nagargoje	PE/2019-2/017
Purushottam Bhaskarrao Suryavanshi	PE/2019-2/018
Hafiz Ahmed	PE/2019-2/019
Vivek Yadav	PE/2019-2/020
Kolimi Prashanth Reddy	PE/2019-2/021
Payel Chakraborty	PE/2019-2/022
Palash Prajapati	PE/2019-2/023
Gavali Raj Tatyarao	PE/2019-2/024
Bhakti Mahendra Pawar	PE/2019-2/025
Gomte Shyam Sudhakar	PE/2019-2/026
Kale Gajanan Manohar	PE/2019-2/027
J Venkatesh	PE/2019-2/028
Venkata Prathyusha Eluri	PE/2019-2/029
Kamble Swapnil Mahadu	PE/2019-2/030
Degulapadu Guru Sai Suresh Babu	PE/2019-2/031
Shivakumar M Methri	PE/2019-2/032
Ninad Rajendra Sutar	PE/2019-2/033

Ph.D Passed out 2020-21

Department	Name	Registration No
Pharmacology & Toxicology	Madhana Rajaram Mohanrao	PC/2013-III/010/Ph.D.
	Sahabuddin Ahmed	PC/2014-IV/011/Ph.D.
	Mohit Kwatra	PC/2014-IV/012/Ph.D.
Biotechnology	Basamsetty Veera Vijaya	BT/2014-I/001/Ph.D.

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- **Mr. G Sai Sarath Kumar**
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nayanikadevi34@gmail.com

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RA
- **Dr. G. Jagadeesh Kumar**
RA-I
- **Md. Jahangir Alam**
ICMR-RA
- **Mrs. Harsha Chandran**
Project Associate-II
- **Dr. Peeyush K. Sarma**
RA
- **Mr. Sahabuddin Ahmed**
Research Associate
- **Dr. Piyush Tehri**
RA-I(NDTL)

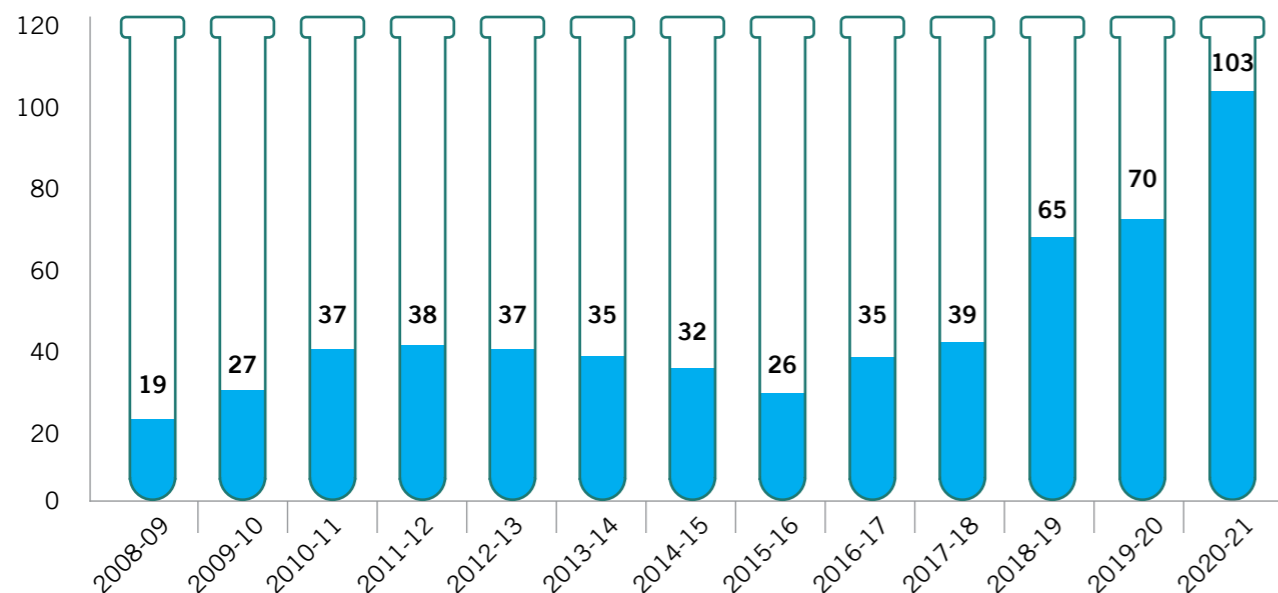
NIRF-Institutional Ranking

NIPER-Guwahati Secured TOP-11 RANK under PHARMACY CATEGORY in NIRF-2020 RANKINGS

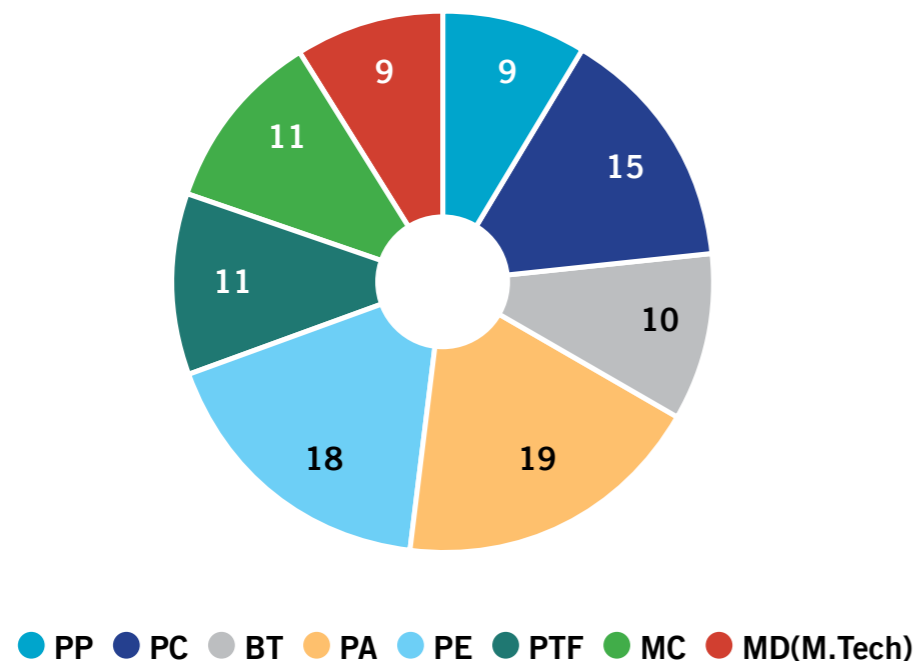


ACADEMIC INFOGRAPHICS

Number of MS/ M. Pharm/ M.Tech Students Admitted

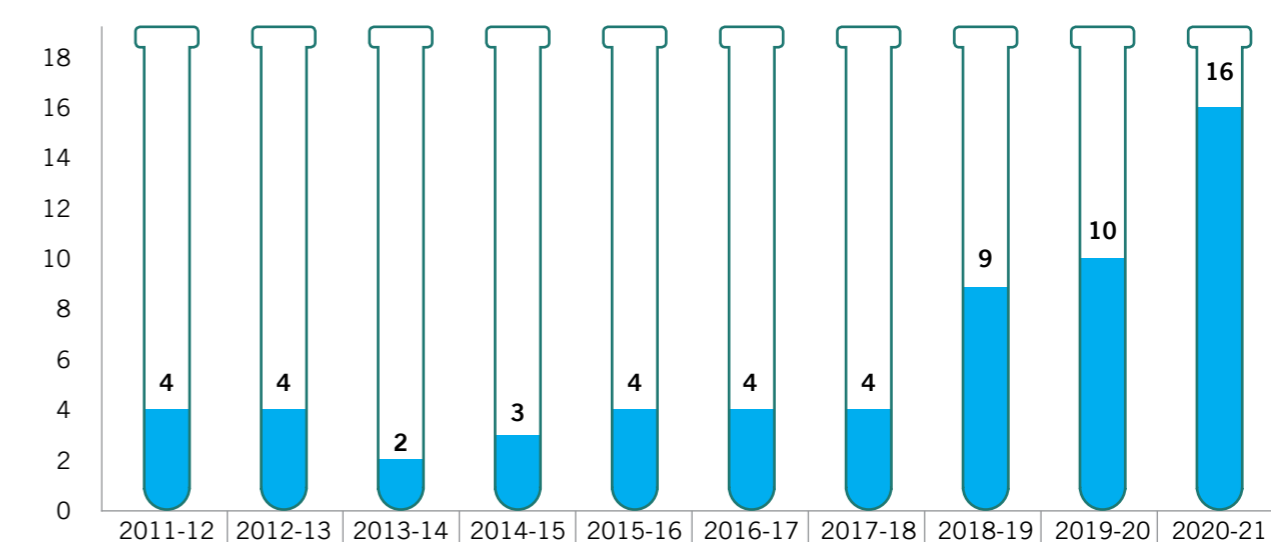


Department wise number of M.S./ M.Pharm/ M.Tech Students Admitted (2020-21)

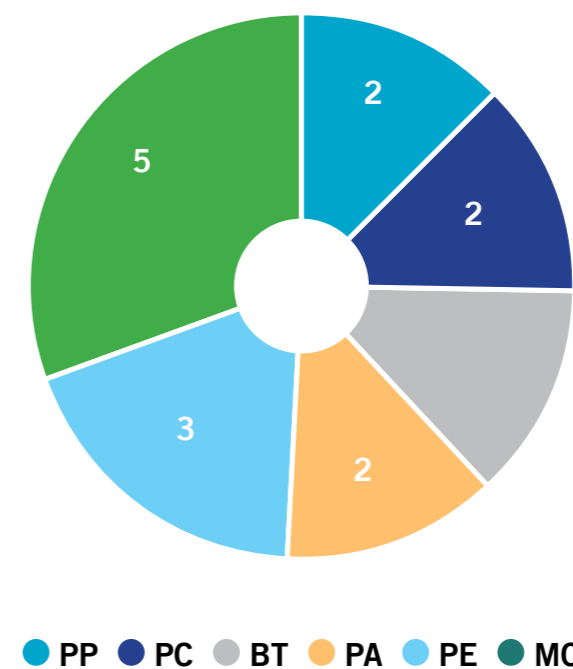


ACADEMIC INFOGRAPHICS

Number of Ph.D. Students Admitted

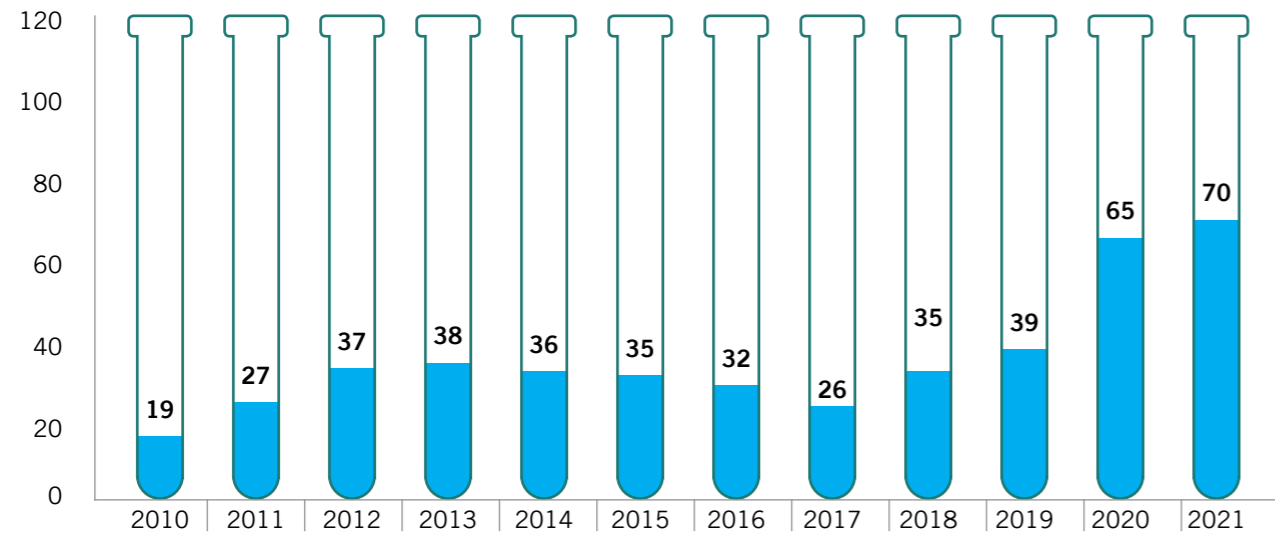


Department wise number of Ph.D. Students Admitted (2020-21)

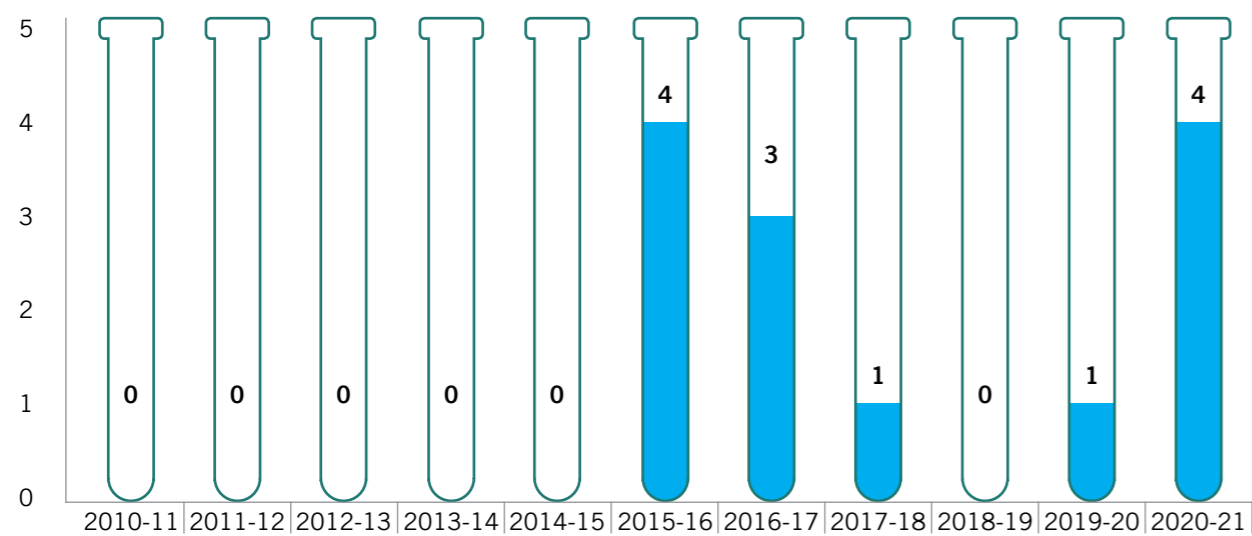


ACADEMIC INFOGRAPHICS

Total No. of Student passed out

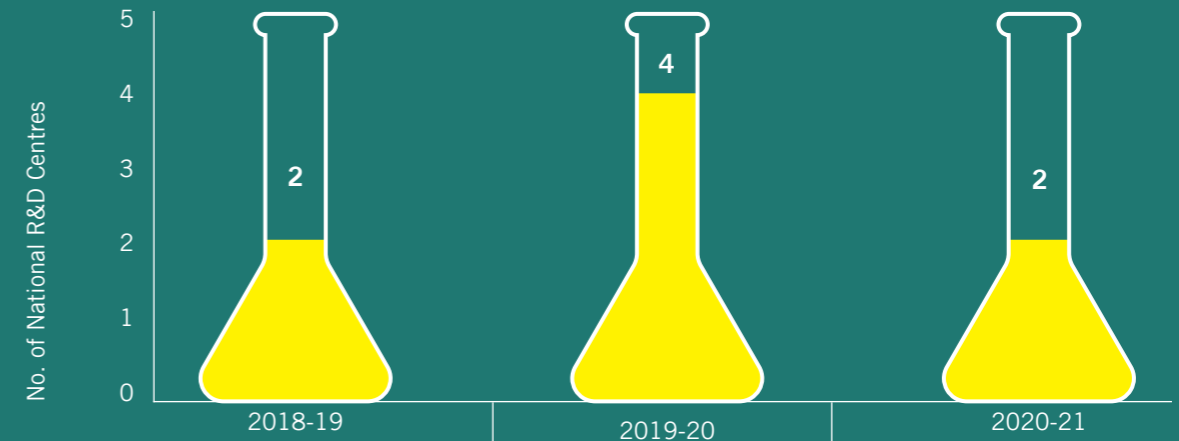


Total No. of PhD Awardees

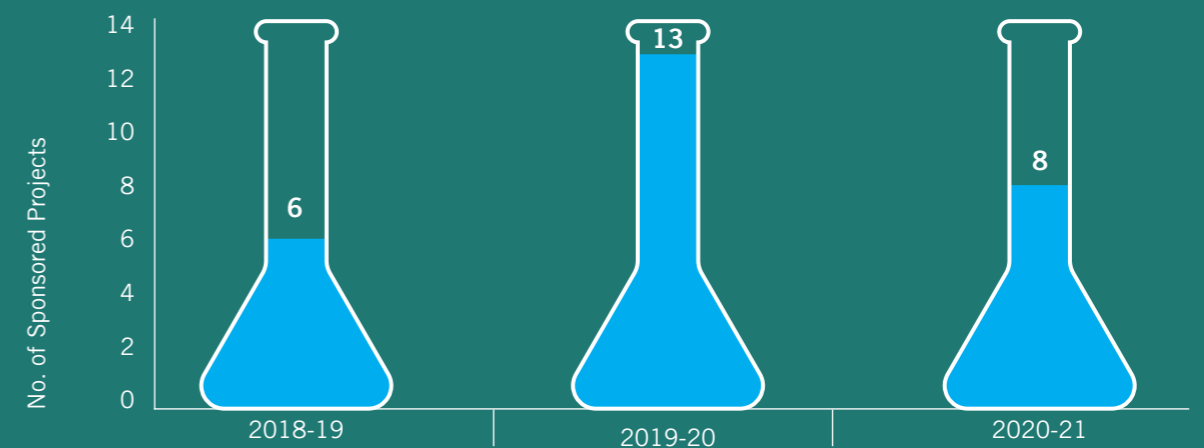


Research & Development Activities

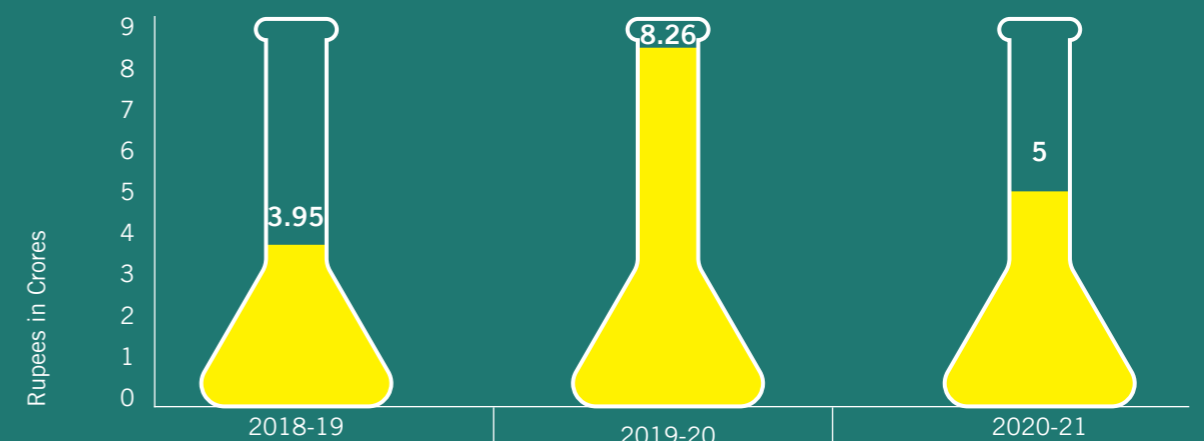
National R & D Centres (State-of-the-art facilities)



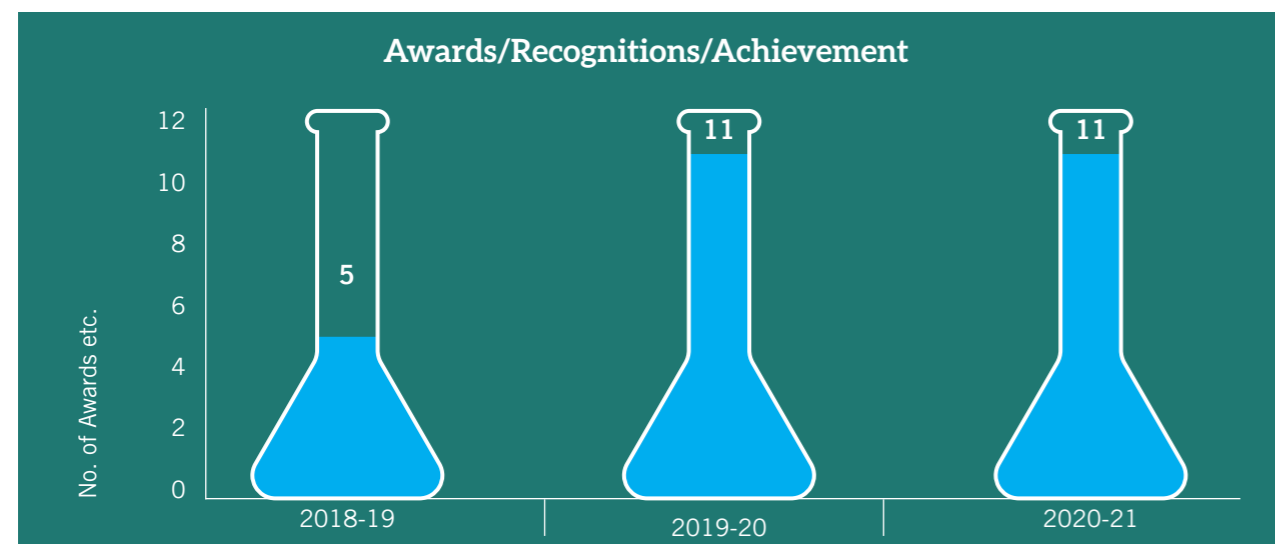
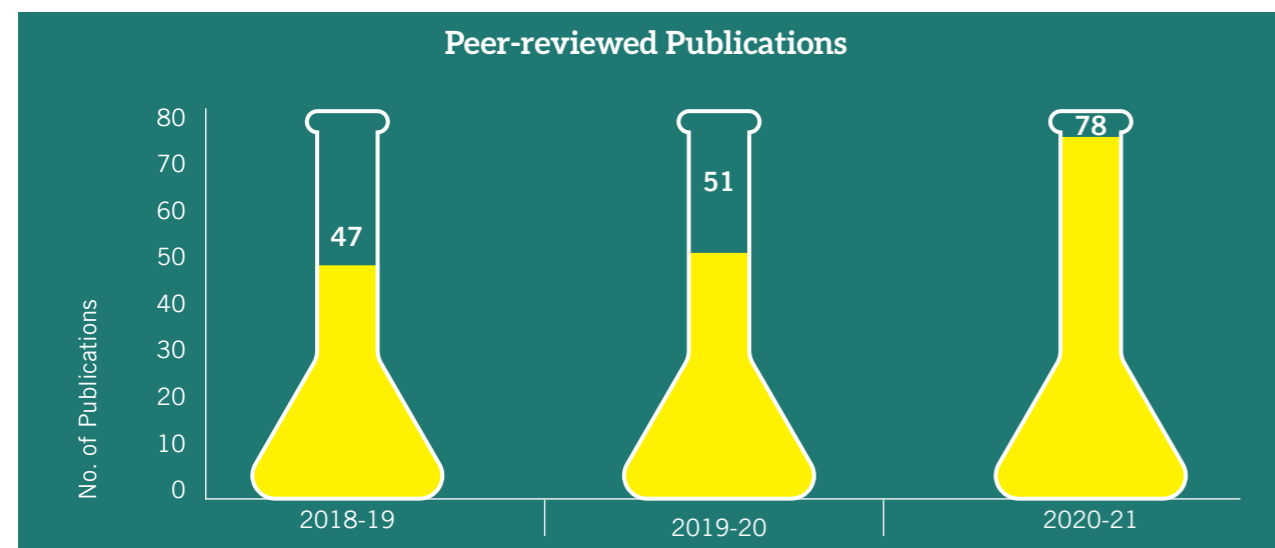
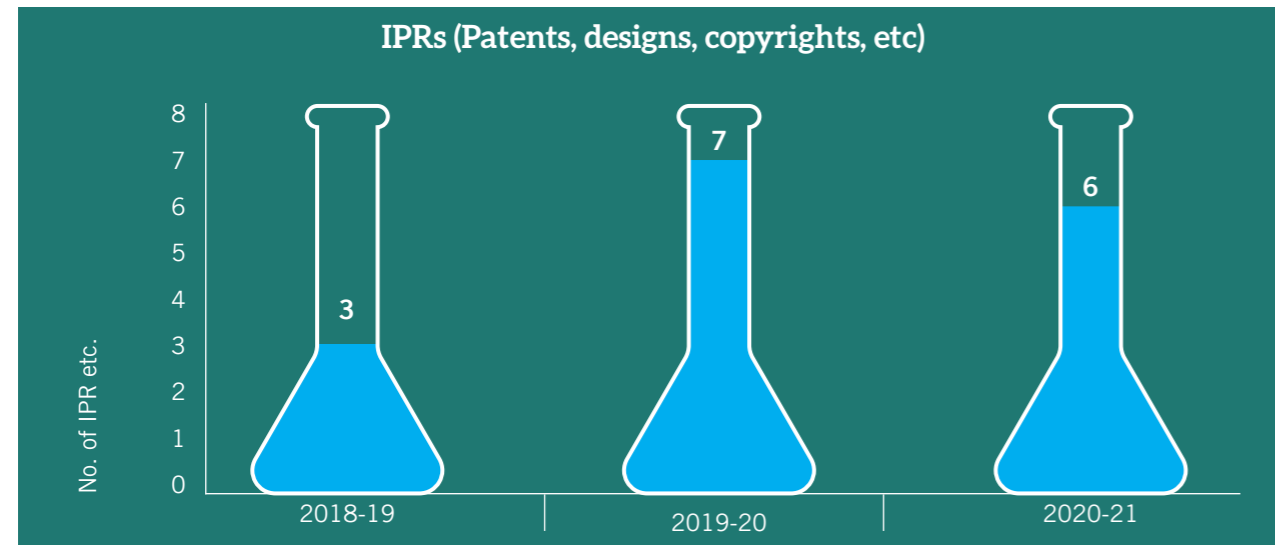
Total no. of Sponsored Projects



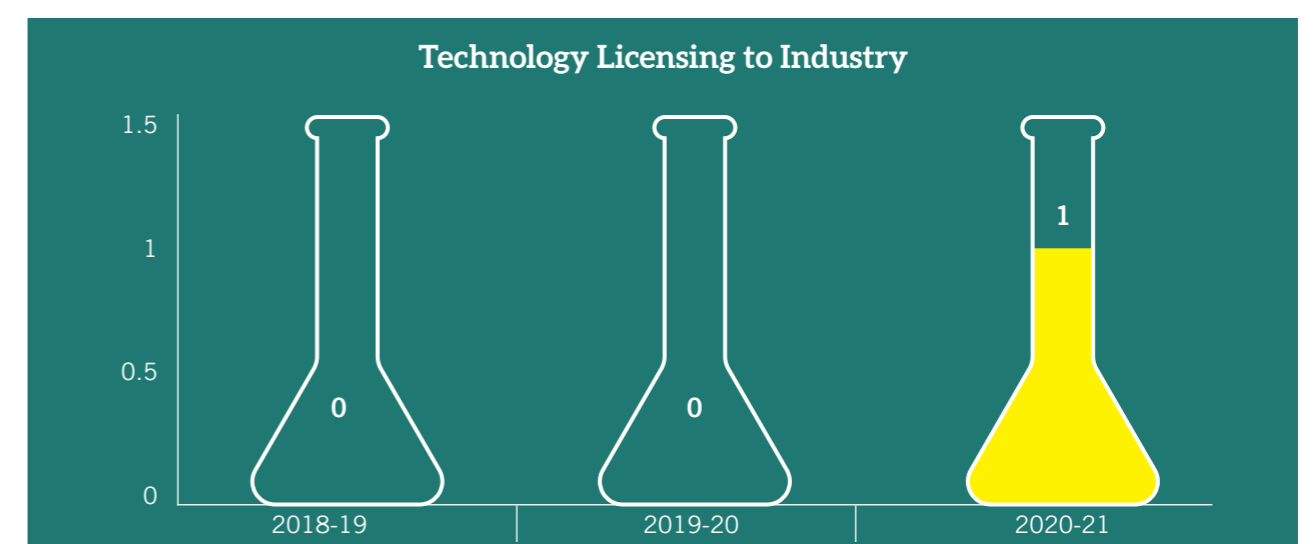
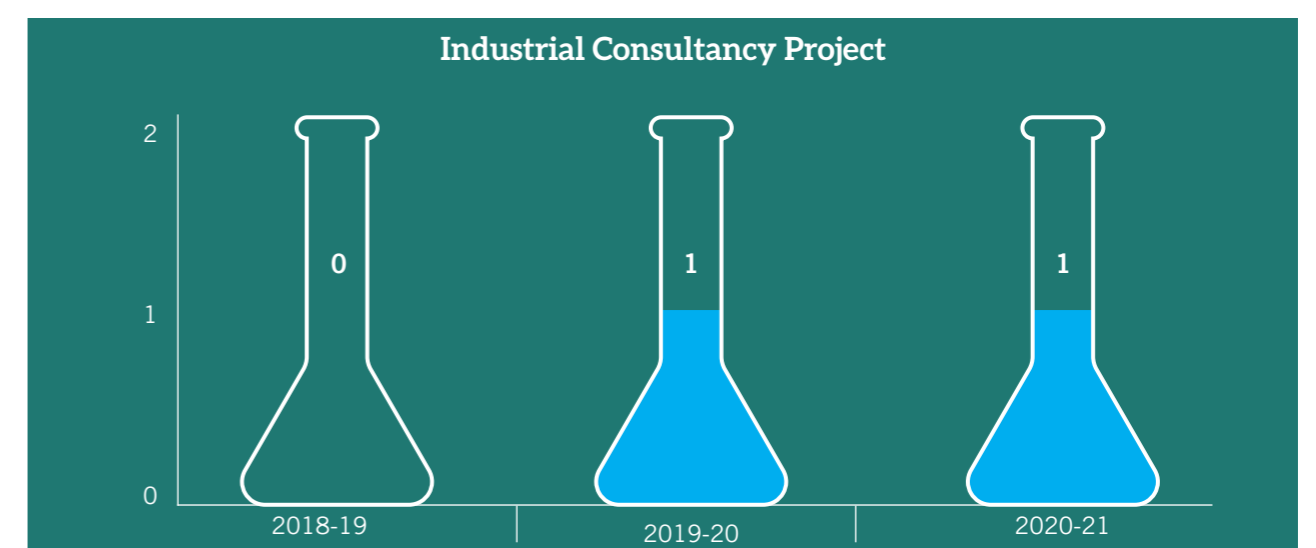
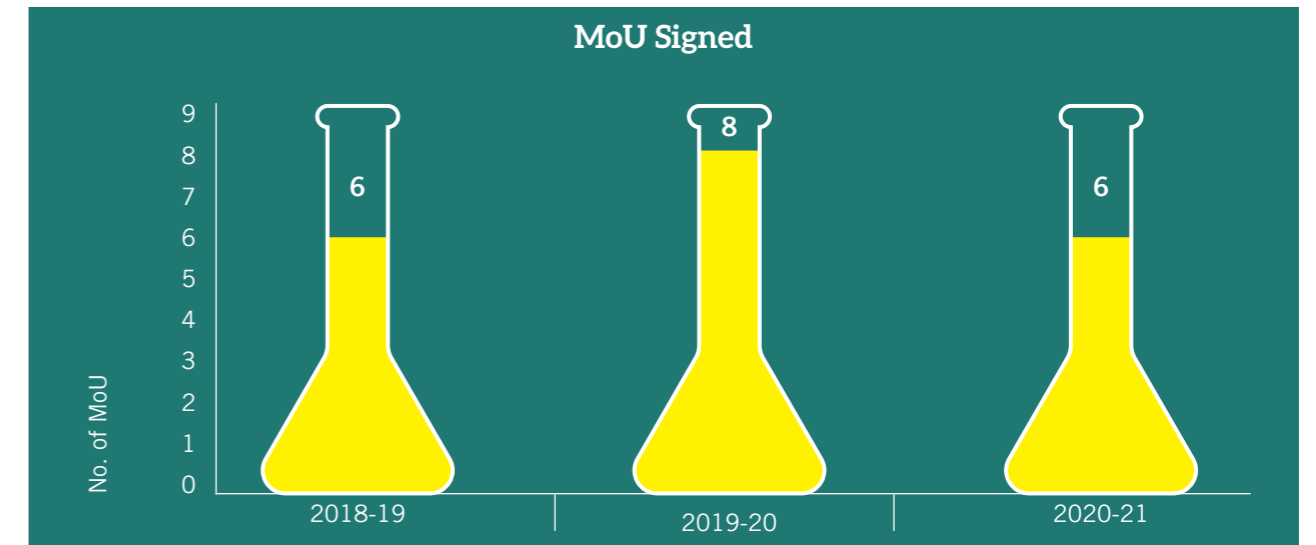
Total Amount Received (In INR)



Research & Development Activites



Research & Development Activites



GOLD MEDALISTS (2018-2020)



Soumya Meka

PP/2018-XI/084
Pharmacy Practice

Gold Medal Sponsor
Dr. U.S.N. Murty
Founder Director,
NIPER Guwahati



Bishal Rajdev

PC/2018-XI/180
Pharmacology & Toxicology

Gold Medal Sponsor
NIPER-Guwahati



Sudipto Kumar Paul

BT/2018-IX/074
Biotechnology

Gold Medal Sponsor
NIPER-Guwahati



Pannuru Supraja

PA/2018-I/001
Pharmaceutical Analysis

Gold Medal Sponsor
Daicel Chiral Technologies (India)
Private Limited



Hemanth Vikram

P.R. PA/2018-I/002
Pharmaceutical Analysis

Gold Medal Sponsor
NIPER-Guwahati



Oly Katari

PE/2018-I/007
Pharmaceutics

Gold Medal Sponsor
NIPER-Guwahati

PLACEMENT

The courses offered from NIPER-Guwahati are very much useful for various industries include Pharmaceutical industries. Our students are very well placed in major Pharmaceutical Industries like Novartis, Dr. Reddy's, GSK, Certara etc., in various departments.

The following career opportunities are available in Pharmaceutical sector.

Pharmacology & Toxicology:

- Drug/Toxicant Information Specialist
- Forensic Scientist/Toxicologist
- Cancer Researcher
- Clinical Researcher
- Regulatory Toxicologist
- Pharmacologist
- Veterinarian/Laboratory Animal Care provider
- Pharmacovigilance scientist
- Invitro/Invivo scientist

Biotechnology:

- Cell/Molecular Biologist
- Microbiologist
- Bio-Medical engineers
- Medical Communicators
- Synthetic Biology
- Vaccines & Biologics specialist
- Medical Coding
- Medical Science Liaisons

Pharmacy Practice:

- Clinical Pharmacist
- Clinical Researcher
- Clinical Data Management
- Clinical Scientific Experts
- Pharmaceutical Formulation Development Scientist
- Regulatory Affairs Expert
- Scientific writers
- Bio Informatics scientist

Pharmaceutical Analysis:

- Formulation Analytical Research & Development Scientist
- APIAnalytical Research & Development Scientist
- Quality Control Expert
- Regulatory Affairs Expert
- Scientific Liaisons

Pharmaceutics:

- Academic Sector
- Pharmaceutical/Cosmeceutical/Nutraceutical Industries
- Scientific Positions
- Formulation R & D
- Process Scale-up
- Technology Transfer

Medicinal Chemistry:

- Drug Discovery & Development
- Process Research & Development
- Small Molecules Development
- Large Molecules Development

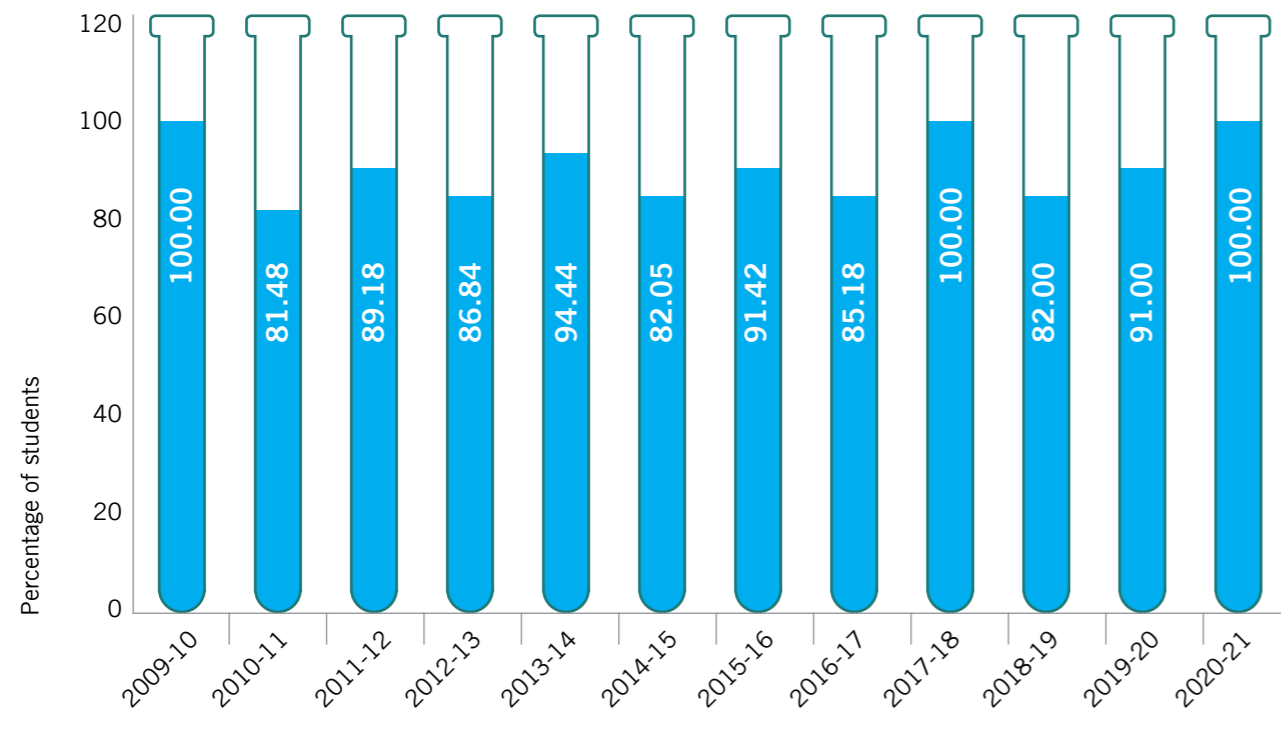
Pharmaceutical Technology (Formulations):

- Academic Sector
- Pharmaceutical/Cosmeceutical/Nutraceutical Industries
- Scientific Positions
- Formulation R & D
- Process Scale-up
- Technology Transfer

Medical Devices:

- Healthcare and medical device sectors
- Medical device regulatory affairs

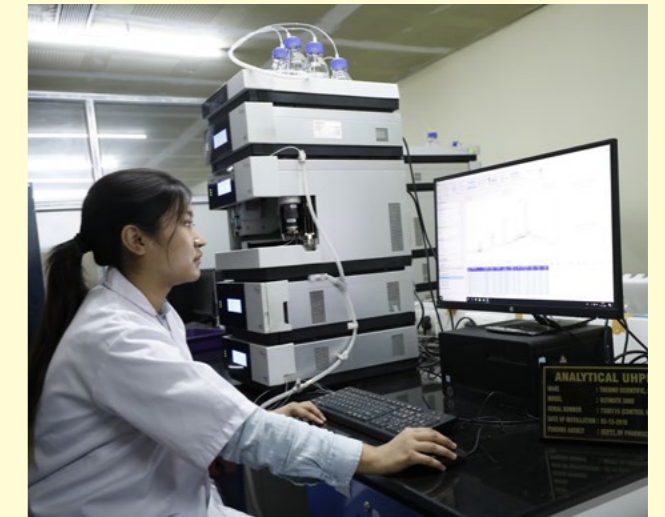
Year wise Campus Placements, NIPER-Guwahati



CENTRAL INSTRUMENTATION FACILITY (CIF)



3D Printer



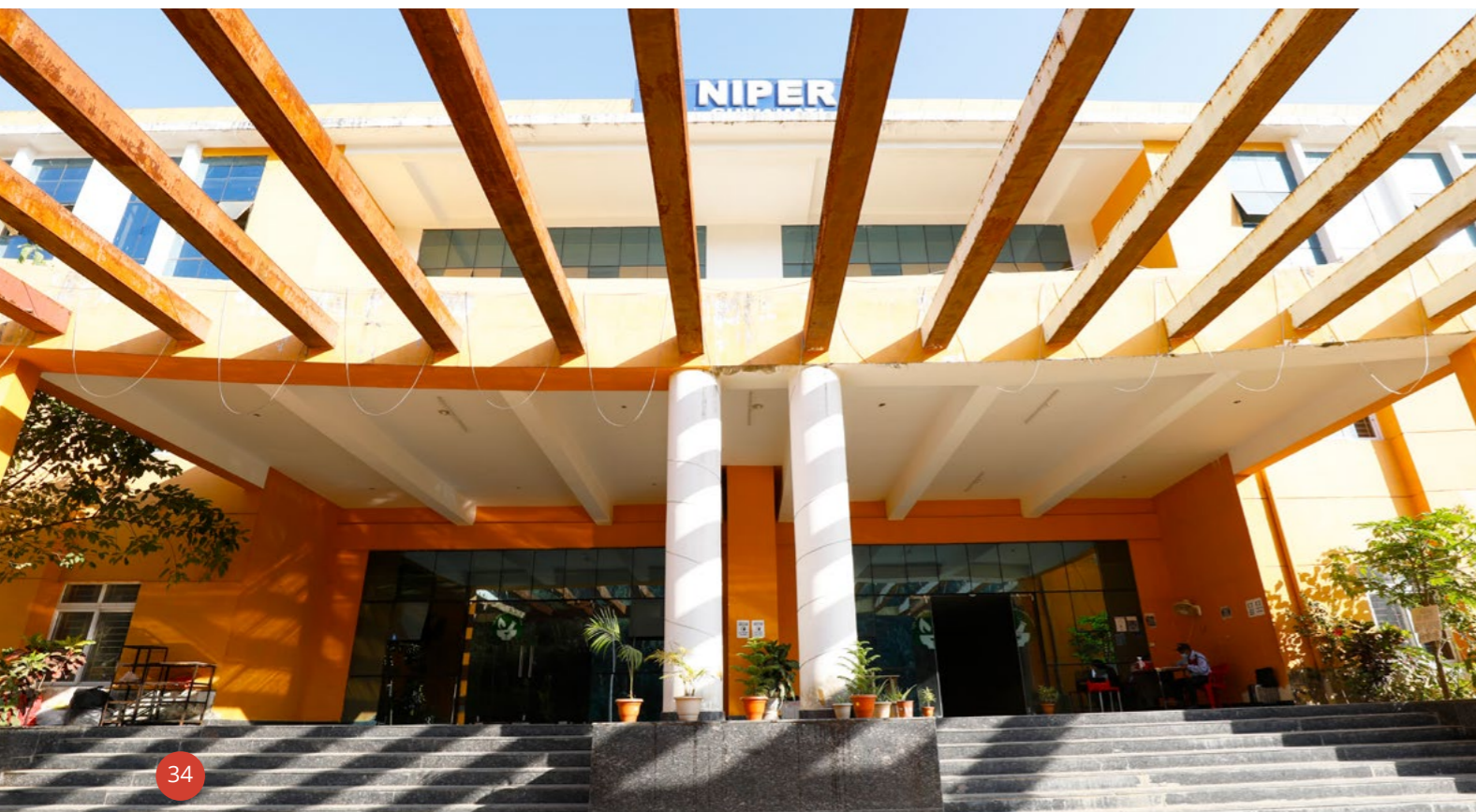
Analytical UHPLC



Differential Scanning Calorimeter



Dissolution Apparatus





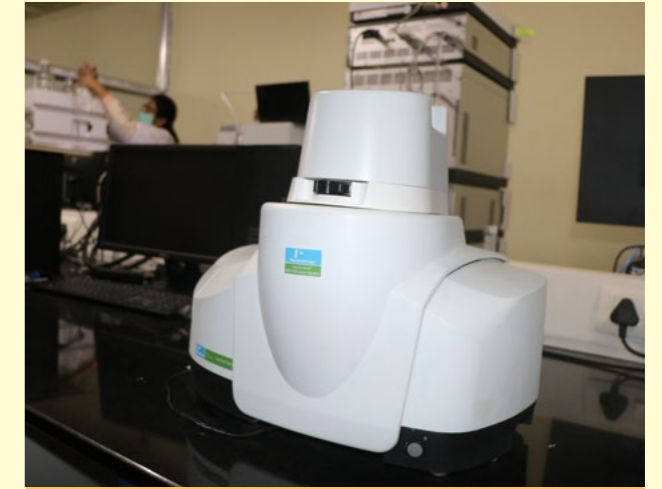
Inverted Fluorescence Microscope



FTIR



LCMS



NIR



GCMS



High Energy Ball Mill



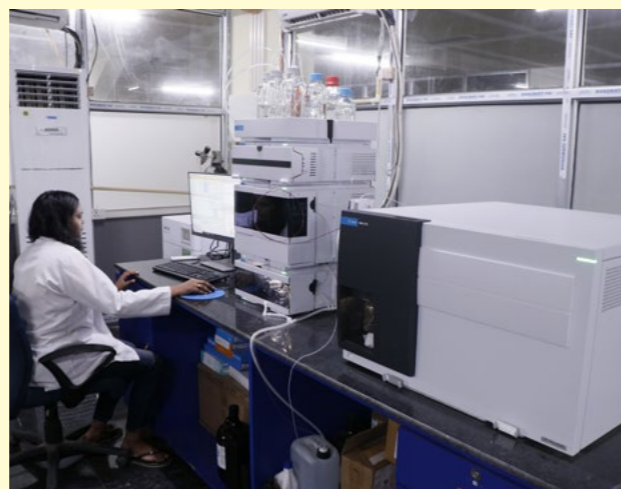
QToF



Rotary Evaporator



HPLC



UPLC/ESI/MS/MS



Thermogravimetric Analysis



UV-VIS Spectrophotometer

HIGHLIGHTS OF THE ACADEMIC DEPARTMENTS AT NIPER GUWAHATI



Department of Pharmaceutics

The major apparitions for the Department of Pharmaceutics are to inculcate how the me-too active pharmaceutical ingredients can be converted into outcome-oriented as well as patient-friendly end user formulations. Through the industrial-oriented syllabus contents and intense training at this department during their study, the students are exposed to recent know-how of the technology used to make the final formulations. The basic knowledge about pharmaceutical technology and the proper way to get patent for their innovative ideas are the additional unique features of the program blended with the presence of highly-reputed faculty members with vast experience.

Thrust Areas of the Department

- Dosage form design, development, optimization and evaluations for BCS-II & III drugs
- Micro-and nanotheragnosis concepts for the early detection and treatment of malignant diseases and other life-threatening diseases
- Eradication of biofilm-producing microorganisms from the surfaces of implanted or inserted medical devices into human body
- Ligand anchored lipid/polymer-mediated nanoarchitectonics
- Pharmacoengineering approaches to fight against neglected diseases
- Pharmaceutical Additive Manufacturing Engineering / 3D-4D Printing Technology
- Nanomedicines for organ/lymphatic delivery with deep molecular insights
- Extrusion based filaments processing for fused-filaments applications
- Translational cutting-edge pharmaceutical research & development

Facilities available

- Mini Workshop facility for R & D scale solid-dosage form designs & development.
- Rapid Prototyping Platform Technology
- CAD, QBD, AI based Software Facility for dosage form designs & optimizations.
- BA/BE facility
- In-vitro physico-chemical & physico-technological facilities.
- Customized biofilament production facility
- Advanced Instrumental facilities pertaining to Pharmaceutical validations.

Faculty



Dr. S. Tamilvanan

Associate Professor
Email: tamilvanan.s@niperguwahati.ac.in

Research Interest:

Use of computer intelligence and neuronal networking tools for developing high quality pharmaceutical dosage forms with reduced excipient's amount



Dr. Amit Alexander

Associate Professor
Email: amit.alexander@niperguwahati.ac.in

Research Interest:

Development of Nano carrier systems, Polymeric drug conjugations, Drug targeting and Pharmacokinetics, In vitro dissolution kinetics and data analysis.



Subham Banerjee, Ph.D., MNASc., MRSC, FICS

Assistant Professor
Email: subham.banerjee@niperguwahati.ac.in

Research Interest:

Pharmacoengineering, Pharmaceutical 3D/4D Printing/Additive Manufacturing Engineering, Nanomedicines.

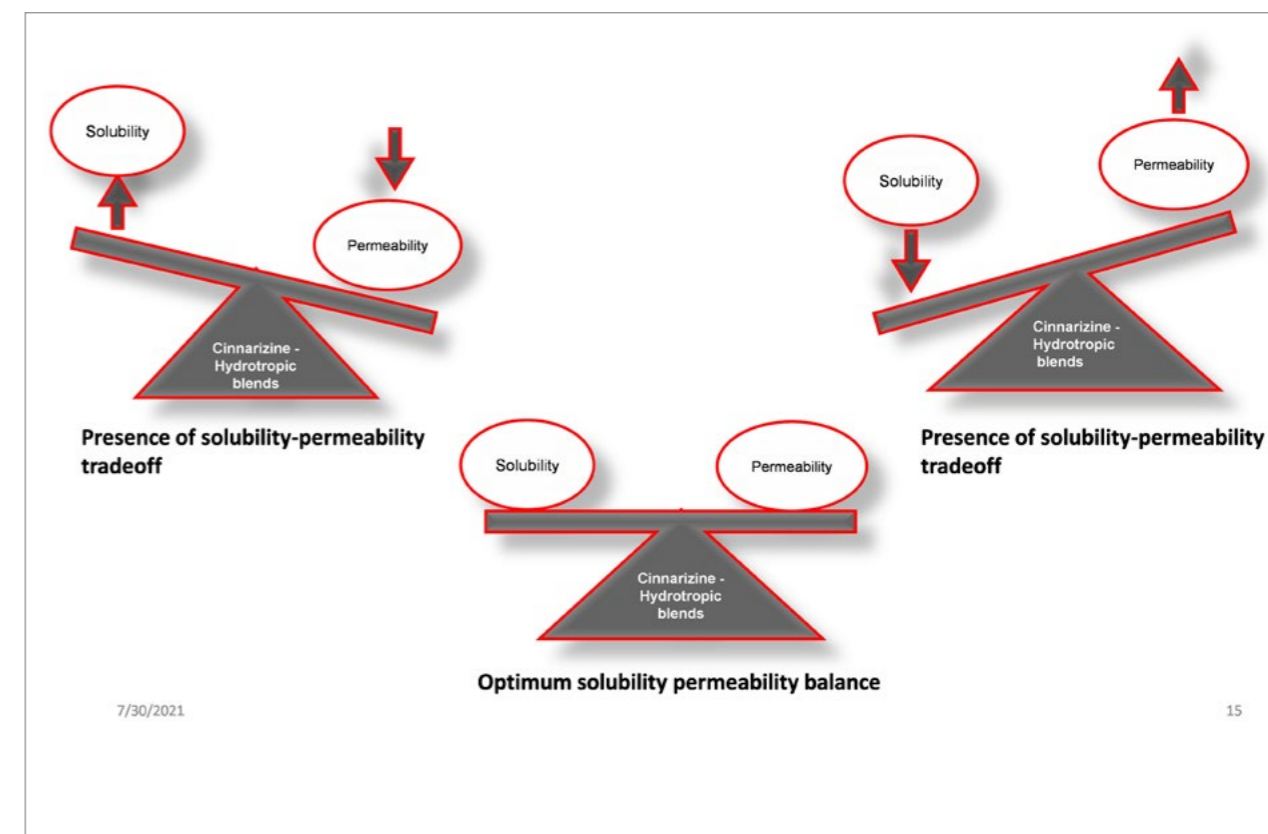


Dr. S. Tamilvanan

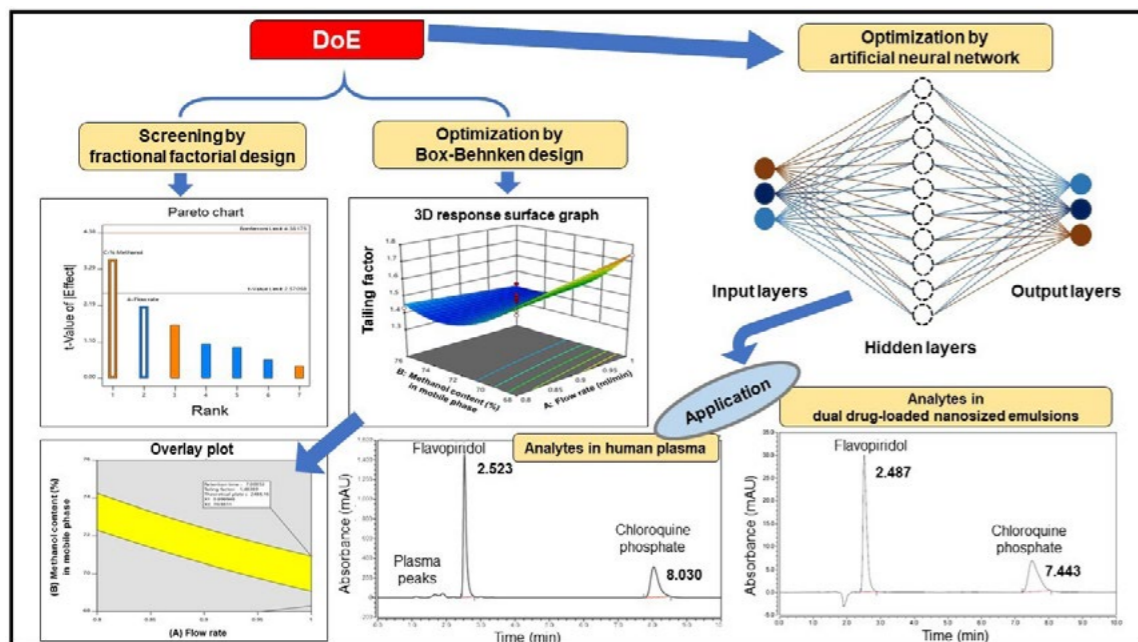
Associate Professor & In-charge

Research Areas:

- 1) On the use of linear (DoE) model-based optimization to obtain optimum solubility permeability balance (OSPB)

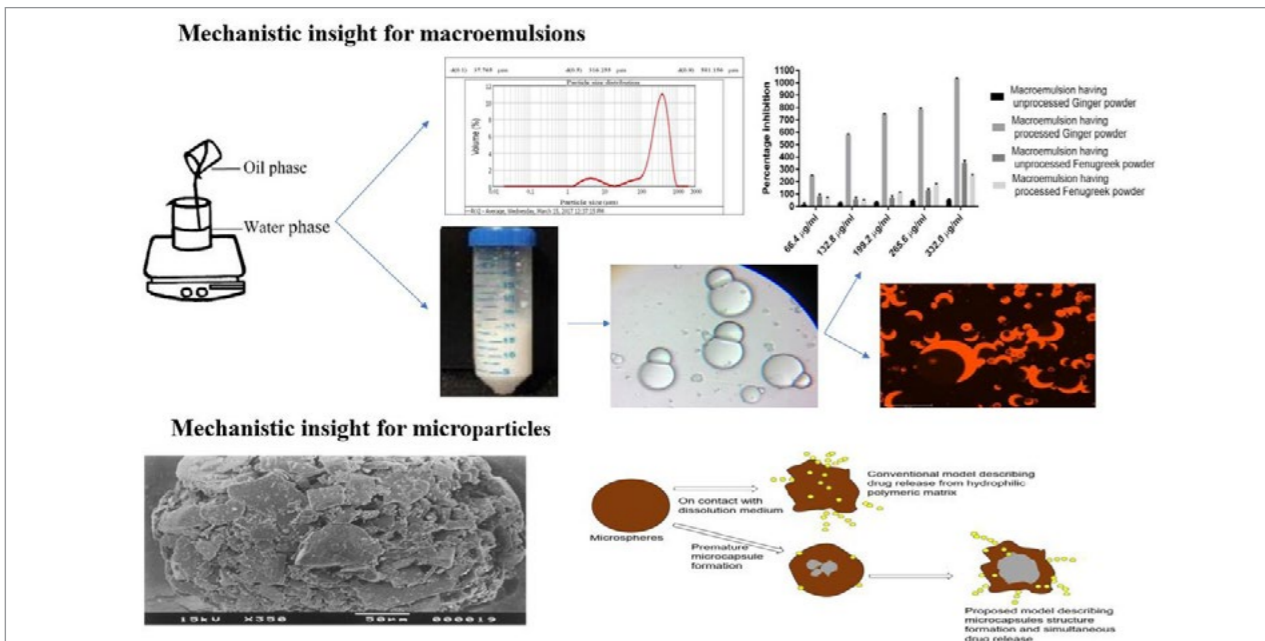


2) Application of both linear (DoE) -and non-linear (ANN)-models to systematically optimize the analytical method for concurrent estimation of two drugs



3) Mechanistic insight for macroemulsions and microparticles

In the present scenario, the fragile long-term stability profile associated with o/w nanosized emulsions can be overcome by producing o/w macroemulsions. Similarly, the multiple-unit microparticles are also shared an equal positioning in terms of the research and market success with their nanocarriers (capsules/spheres) counterparts. The presence of virtual compartmentalized structure of dispersed oil droplets in o/w macroemulsions is a welcome new addition/contribution to the emulsion science. On the other hand, the incorporation of active pharmaceutical ingredients (APIs) in varying concentrations into the microparticles always shows either solid solution or drug crystalline physical forms/state. With the help of eutectic liquid, the auto-conversion from microspheres to microcapsules structure on contact with dissolution medium can also be a possible explanation to show why and how the drug release happened from micron-level particulate systems.



Research Collaboration

- Dr. Dipankar Das
Senior Ophthalmologist, Sri Sankardeva Nithralaya Hospital, Guwahati
- Dr. Srinivasa Rao
Scientist C, IICT, Hyderabad
- Dr. Vivek Singh
Scientist, L.V. Prasad Eye Hospital, Hyderabad

Research Group

Ph.D. Students



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Payel Chakraborty

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PE/2019-2/022



Pawar Bhakti Mahendra

Registration no.
PE/2019-2/025



Shivakumar M. Methri

Registration no.
PE/2019-02/032



Dr. Amit Alexander

M. Pharm., Ph.D

Associate Professor & In-charge

Research Areas:

- Design and development of various nanocarrier system to resolve the constraints of conventional therapy including
 - Polymeric (PLGA, pNIPAAm, Chitosan etc.) nanoparticles.
 - Lipid based drug delivery systems like, Nano lipid carrier (NLC), Solid lipid nanoparticle (SLN), Liposome, etc.
 - Mesoporous silica nanoparticles.
 - Thermoresponsive in situ injectable hydrogels.
- Exploring the application of stimuli triggered drug delivery system for drug targeting to specific site of action
- Development of in situ gel or hydrogel based drug carrier system for oral, nasal or parenteral administration of therapeutics
- Exploring the scope of various route of drug administration to the brain other than conventional routes like nose-to-brain delivery, to increase bioavailability and therapeutic efficacy of bioactives
- Development of novel carrier system for effective drug delivery to the brain to treat neurodegenerative disorders like Alzheimer's disease and cancer therapy
- Pharmacokinetic and biopharmaceutical assessment of novel formulations
- Estimation of pharmacokinetic data for different compartment models
- Optimization of the formulations using Quality by Design (QbD) approach
- Bioavailability and Bioequivalence measurements
- Novel approaches for solubility enhancement of poorly soluble drugs

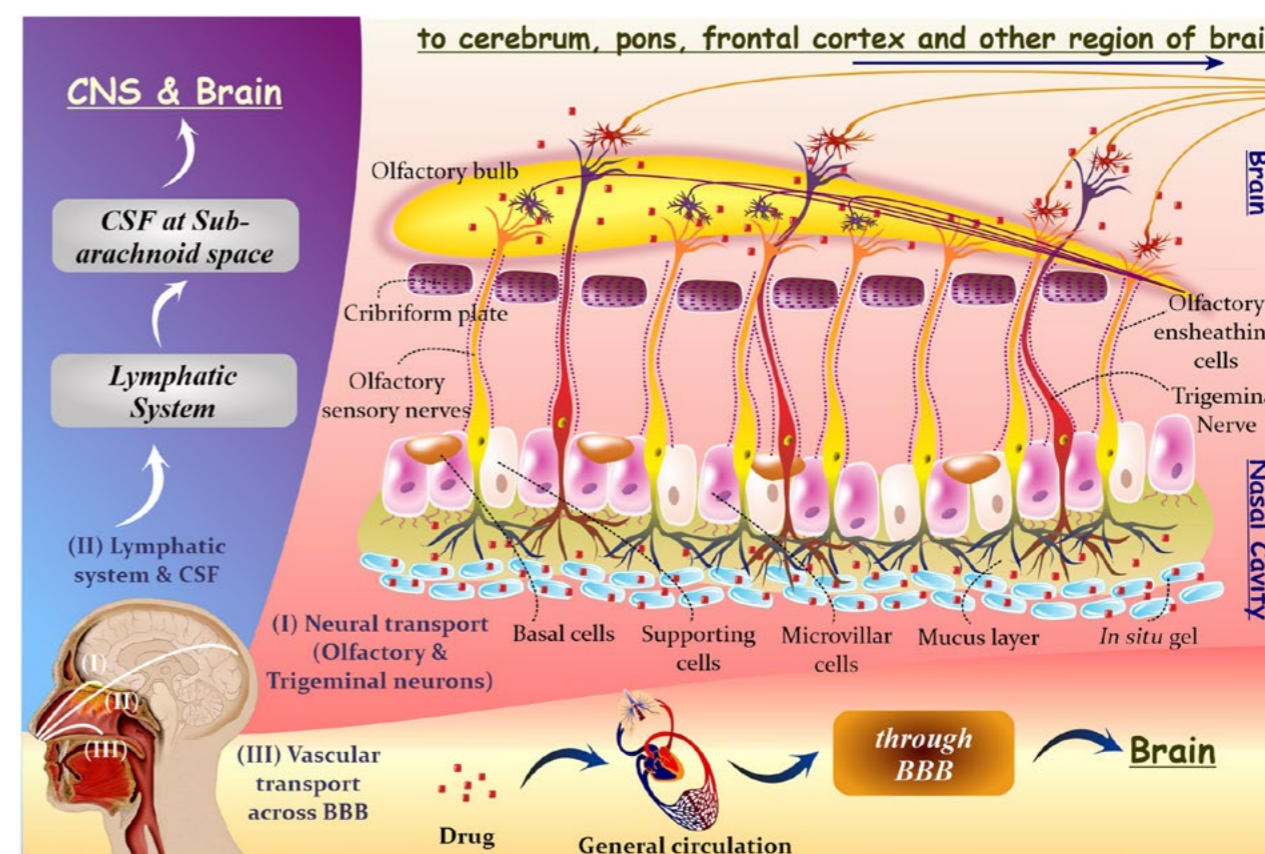


Scientific Highlights (2020-2021)

Publication (Research/Review articles)

1. Stimuli-responsive In situ gelling system for nose-to-brain drug delivery

The diagnosis and treatment of neurological ailments always remain an utmost challenge for research fraternity due to the presence of BBB. The intranasal route appeared as an attractive and alternative route for brain targeting of therapeutics without the intrusion of BBB and GI exposure. This route directly and effectively delivers the therapeutics to different regions of the brain via olfactory and trigeminal nerve pathways. However, shorter drug retention time and mucociliary clearance curtail the efficiency of the intranasal route. The in situ mucoadhesive gel overthrew the limitations of direct nose-to-brain delivery by not only enhancing nasal residence time but also minimizing the mucociliary clearance and enzymatic degradation. This delivery system further improves the nasal absorption as well as bioavailability of drugs in the brain. Owing to multiple benefits, in situ gelling system has been widely explored to target the brain via nasal route. This piece of work, we have initially discussed the global statistics of neurological disorders reported by WHO and other reputed organizations, nasal anatomy, mechanism and challenges of nose-to-brain drug delivery. The work mainly focused on the use of different stimuli-responsive polymers, specifically thermoresponsive, pH-responsive, and ion triggered systems for the development of an effective and controlled dosage form, i.e., in situ nasal gel for brain targeting of bioactives.



Source: Stimuli-responsive In situ gelling system for nose-to-brain drug delivery. *Journal of Controlled Release*. 2020; 327: 235-265. <https://doi.org/10.1016/j.jconrel.2020.07.044>

2. Light assisted photodynamic therapy of QbD optimized herbal anticancer nanoliposomes for breast cancer treatment: Preparation, characterization, ROS generation, and MCF-7 cell lines study

Photodynamic therapy (PDT) is a technique used in the treatment of cancer. In the present work, the herbal drug was encapsulated in liposomes and optimized using Design-Expert software for achieving high entrapment efficiency and drug loading, with a smaller vesicle size. In addition, the efficacy to generate ROS was evaluated in MCF-7 cell lines with the application of a light source.

3. Preparation and characterization of herbal anti-inflammatory drug-loaded mesoporous silica nanoparticles

Inflammation is a primary response from the immune system to any infection or irritation. Inflammation is a significant part of the body's healing process. Mesoporous silica nanoparticles (MSNs) also were reported as one of the strategies by many researchers to overcome the low solubility of drugs. Its tunable size, shape, and surface functionalization make it a different and more useful drug carrier than other nanocarriers. The surface functionalization of mesoporous silica nanoparticles helps achieve various objectives like drug targeting and increased biocompatibility, drug loading and controlled drug release. The herbal anti-inflammatory drug was loaded into MSNs and characterized, and the drug release mechanism was also analyzed.

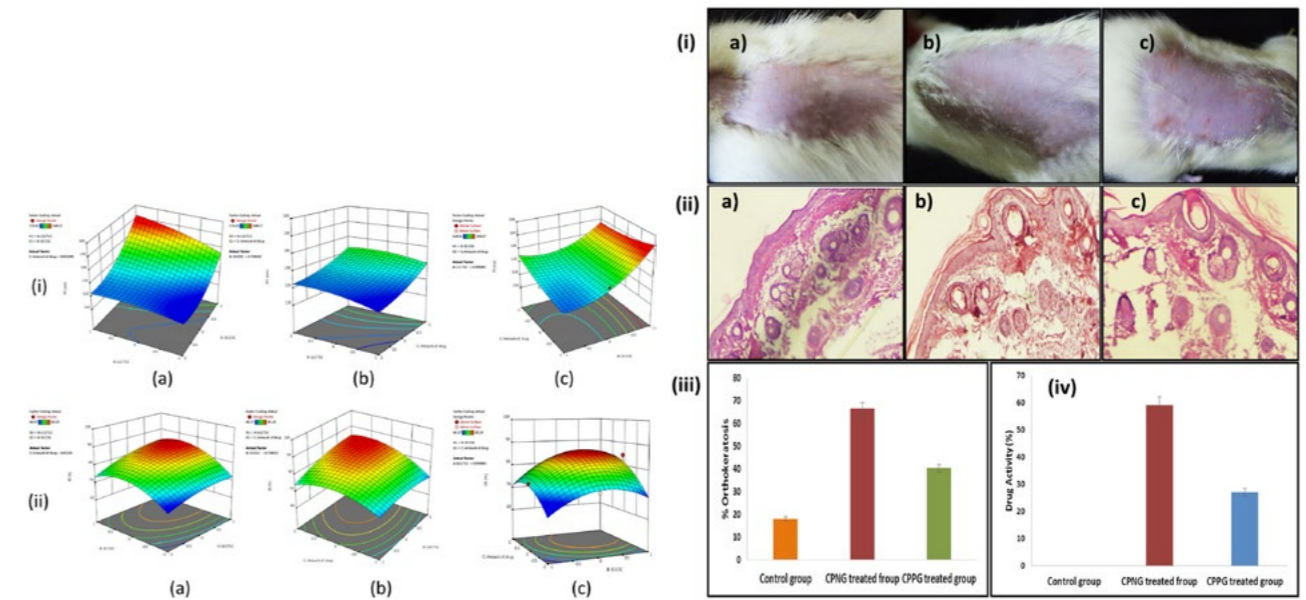


4. Preparation, characterization and evaluation of an anti-inflammatory drug-loaded lipid nanocarriers

Inflammation is the protective action in response to external and internal stimuli like microbial infection, death of cells, cancerous cells, injuries to tissues, etc. The availability of drug at the site of action is low due to its first-pass metabolism; ultimately, it results in less anti-inflammatory effect. The selected drug has low solubility and low skin penetration ability. So, drug was loaded into the lipid nanocarrier, characterized, and the drug release mechanism was also analyzed. The drug loaded lipid carrier was loaded into gelling agents for better application on to skin.

5. Statistically optimized calcipotriol fused nanostructured lipid carriers for effectual topical treatment of psoriasis

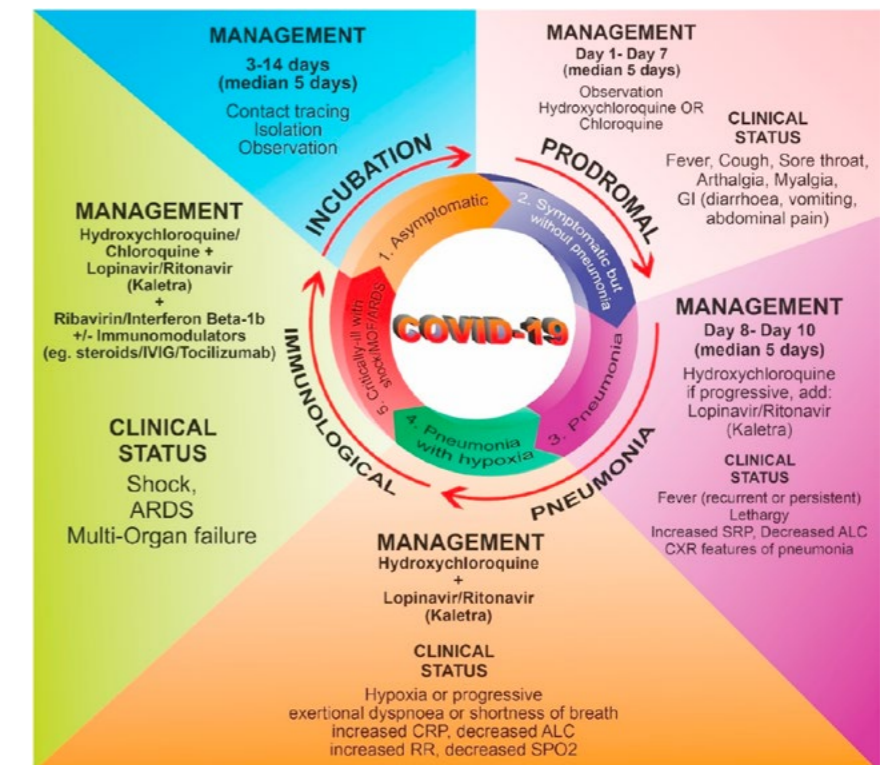
Development and optimization (Box-Behnken design) of calcipotriol (CP) loaded nanostructured lipid carrier (NLC) enriched nanogel for topical treatment of psoriasis. CP-NLCs were prepared, optimized, and investigated in vitro for various physical parameters. Further, the optimized batch of CP-NLCs was loaded into a carbopol 931 gel base to achieve CP enriched nanogel (CPNG) formulation. Mean particle size, zeta potential, and percent entrapment efficiency of an optimized batch of CP-NLCs were found to be 123.60 ± 1.21 nm, -36.8 ± 8.85 mV, and $85.31 \pm 1.18\%$ respectively. TEM confirmed the spherical shape of CP-NLCs. DSC curve demonstrated the absolute dispersal of CP in the matrix. Drug release data verified prolonged drug release obeying the Higuchi model ($r^2 = 0.987$). The developed nanogel formulations presented pH, viscosity, and spreadability in an acceptable range for easy topical application. Ex vivo permeation experiment revealed negligible permeation of drugs into the systemic circulation. Besides, the retention experiment furnished that the retention of CP from nanogel formulation was enhanced by 1.57 in the SC and increased by 3.67 folds in viable layers, as compared to pure CP containing gel formulation. Furthermore, no irritation was reported for developed nanogel formulation. In vivo study on mice tail animal model revealed significantly higher anti-psoriatic efficacy of nanogel formulation in terms of enhancement in % orthokeratosis of skin and % drug activity. Conclusively, the newly developed formulation is an expectant modality for the cure of psoriasis



Source: Statistically optimized calcipotriol fused nanostructured lipid carriers for effectual topical treatment of psoriasis. *Journal of Drug Delivery Science and Technology*. 2021; 61: 102168. DOI: <https://doi.org/10.1016/j.jddst.2020.102168>

6. In-line treatments and clinical initiatives to fight against COVID-19 Outbreak.

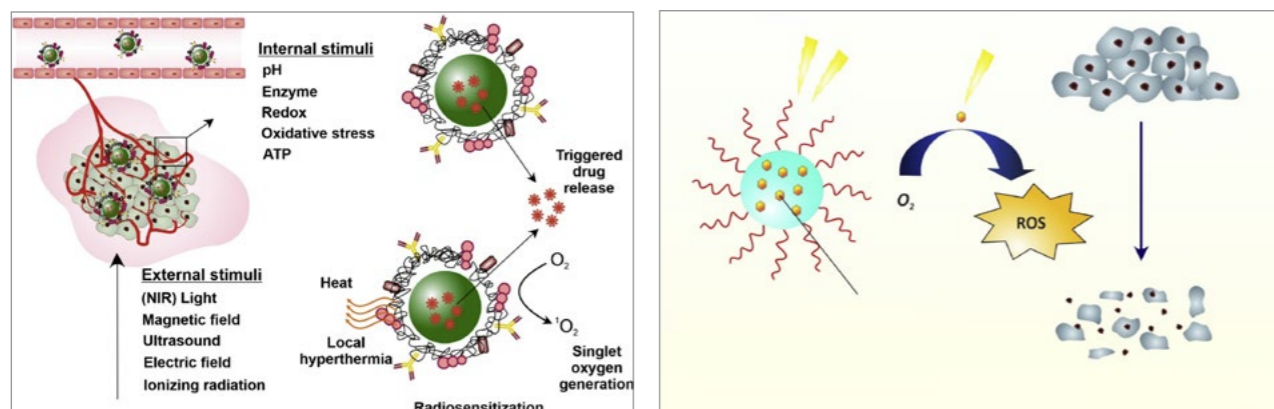
In this review, we have highlighted the current epidemiology through infographics, disease transmission and progression, clinical features and diagnosis and possible therapeutic approaches for COVID-19. The article mainly focused on the development and possible application of various FDA approved drugs, including chloroquine, remdesivir, favipiravir, nefamostat mesylate, penciclovir, nitazoxanide, ribavirin etc., vaccines under development and various registered clinical trials exploring different therapeutic measures for the treatment of COVID-19. This information will definitely help the researchers to understand the in-line scientific progress by various clinical agencies and regulatory bodies against COVID-19.



Source: In-line treatments and clinical initiatives to fight against COVID-19 Outbreak. *Respiratory Medicine*. 2020. 106192. <https://doi.org/10.1016/j.rmed.2020.106192>

7. Recent advances in targeted nanomedicine as promising antitumor therapeutics

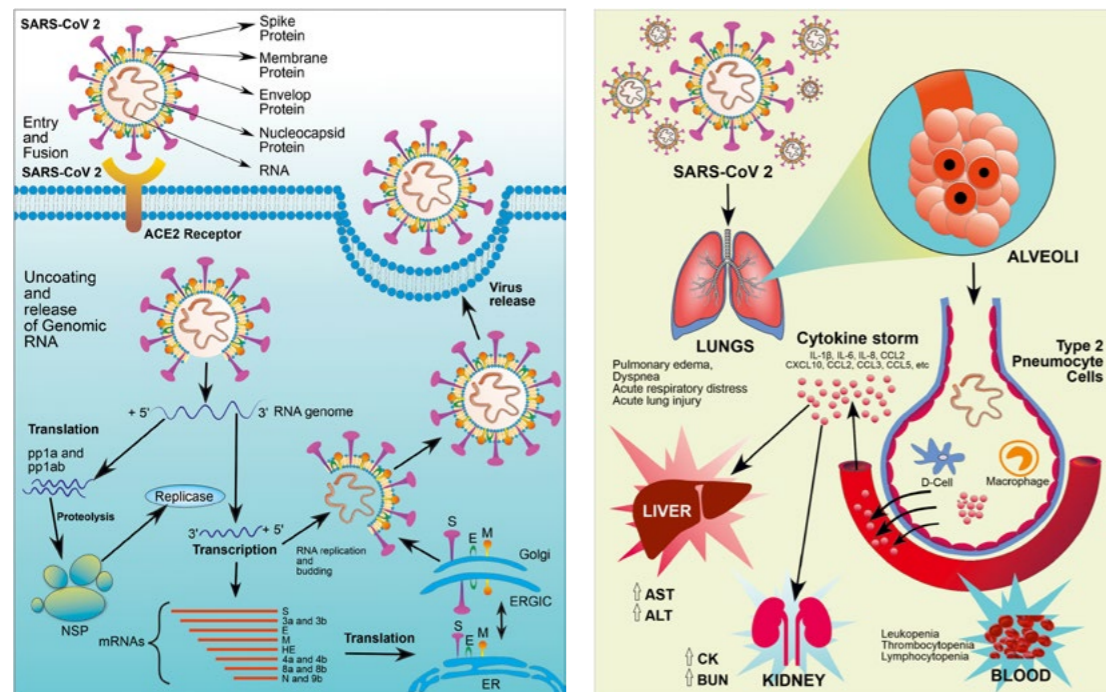
A tumor serves as a major avenue in drug development owing to its complexity. Conventional therapies against tumors possess limitations such as suboptimal therapeutic efficacy and extreme side effects. These display poor pharmacokinetics and lack specific targeting, with non-specific distribution resulting in systemic toxicity. Therefore, nanocarriers targeted against cancers are increasingly being explored. Nanomedicine aids in maintaining a balance between efficacy and toxicity by specifically accumulating in tumors. Nanotherapeutics possess advantages such as increased solubility of chemotherapeutics, encapsulation of multiple drugs and improved biodistribution, and can ensure tumor-directed drug delivery and release via the approaches of passive targeting and active targeting.



Source: Recent advances in targeted nanomedicine as promising antitumor therapeutics. *Drug Discovery Today*. 2020; 25(12): 2227-2244. (Impact Factor: 7.851)

8. Virology, pathogenesis, diagnosis and in-line treatment of COVID-19

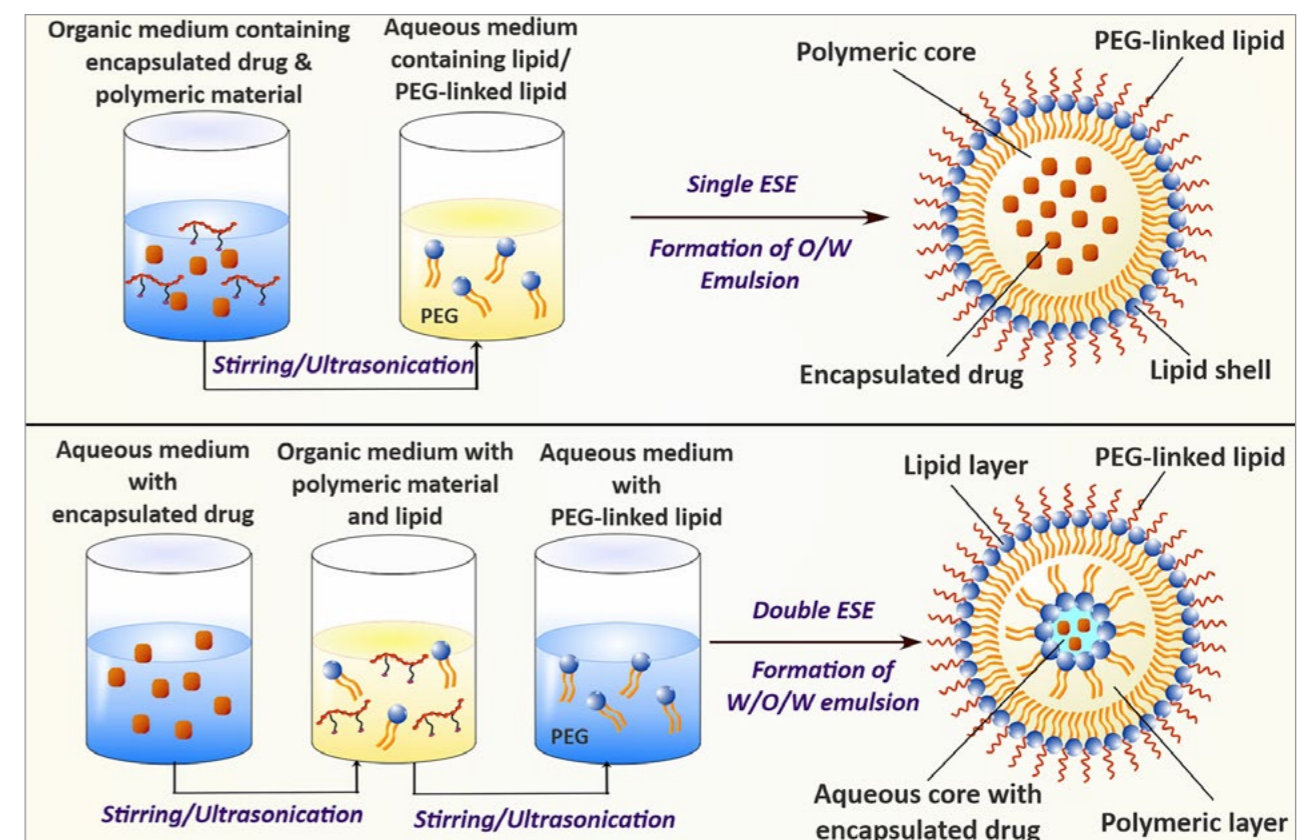
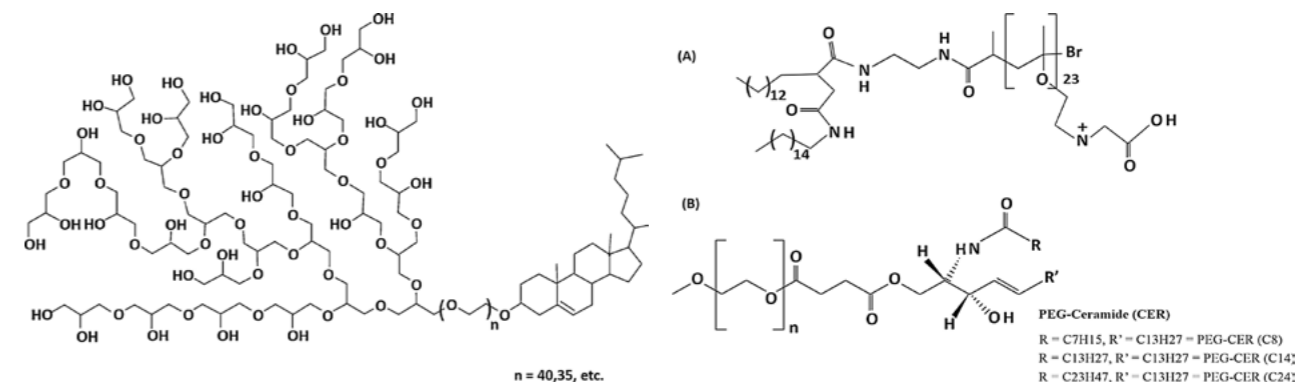
The work highlighted the origin, emergence, structural features, pathogenesis, and clinical features of COVID-19. We have also emphasized the in-line treatment strategies, preventive measures, and vaccines to combat the emergence of COVID-19.



Source: Virology, pathogenesis, diagnosis and in-line treatment of COVID-19. *European Journal of Pharmacology*. 2020; 883: 173375.

9. Role of Stealth Lipids in Nanomedicine-based drug carriers

The primary goal behind the exploration of any new lipid-based nanoformulation is the improvement of the therapeutic index of the concerned drug molecule along with minimization in the associated side-effects. However, for maintaining a sustained delivery of these intravenously injected lipoidal nanomedicines to the targeted tissues and organ systems in the body, longer circulation in the bloodstream, as well as their stability, are important. After administration, upon recognition as foreign entities in the body, these systems are rapidly cleared by the cells associated with the mononuclear phagocyte system. In order to provide these lipid-based systems with long circulation characteristics, techniques such as coating of the lipoidal surface with an inert polymeric material like polyethylene glycol (PEG) assists in imparting 'stealth properties' to these nanoformulations for avoiding recognition by the macrophages of the immune system. In this review, detailed importance is given to the hydrophilic PEG polymer and the role played by PEG-linked lipid polymers in the field of nanomedicine-based drug carriers. The typical structure and classification of stealth lipids, clinical utility, assemblage techniques, physicochemical characterization, and factors governing the in-vivo performance of the PEG-linked lipids containing formulations will be discussed. Eventually, the novel concept of accelerated blood clearance (ABC) phenomenon associated with the use of PEGylated therapeutics will be deliberated.



Source: Role of Stealth Lipids in Nanomedicine-based drug carriers. *Chemistry and Physics of Lipids*. 2020; 235: 105036
<https://doi.org/10.1016/j.chemphyslip.2020.105036>

Research Group

Ph.D. Students



Prabakaran A
(2020-25)



Mithun Rajendra Dethé
(2020-25)

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Venkata Prathyusha Eluri
(2019-21)



Rathod Krishna Dnyaneshwar
(2019-21)



Gajanan Manohar Kale
(2019-21)



Shyam Sudhakar Gomte
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Hafiz Ahmed
(2019-21)



Gavali Raj Tatyrao
(2019-21)



K Prashant Reddy
(2019-21)



Swapnil Kamble
(2019-21)



Subham Banerjee

Ph.D., MNASc., MRSC, FICS

Assistant Professor

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Research Areas:

- Design, prototyping & validations of next-generation cutting-edge translational engineered 3D printed medicines with the involvement of different platform technologies:
 - Fused deposition modelling (FDM)-based rapid prototyping
 - Stereolithography (SLA)-assisted complex & customized geometrics
 - Selective Laser Sintering (SLS)-mediated personalized medicines
- Pharmacoengineering approach based cutting edge next generation engineered healthcare medicines.
- Self-folding encapsulation devices by 4D printing for drug delivery applications.
- Coupling 3D Printing with extruded & validated filaments for FDM Prototyping.
- Customized resin synthesis for SLA printing.
- SLS printing bed powder processing & sintering.
- Pharmacoengineered Lipid Nanoarchitectonics to enhance macrophages uptake for potential translational therapeutic outcomes.



Pharm. Additive Manufacturing Technology Platform

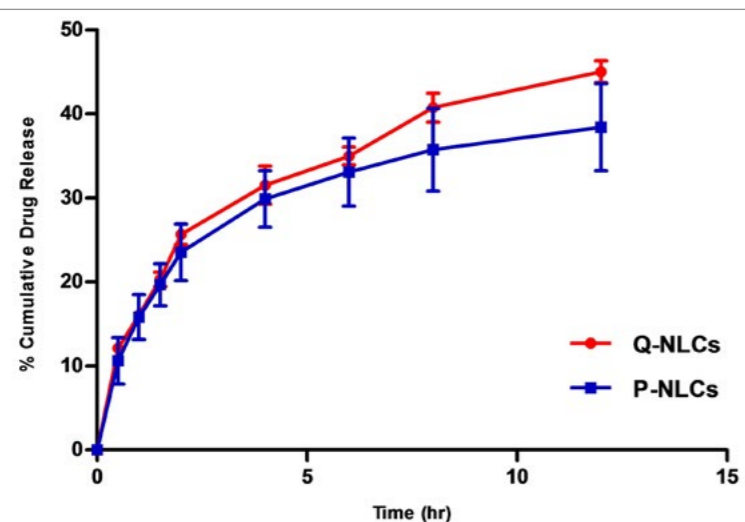
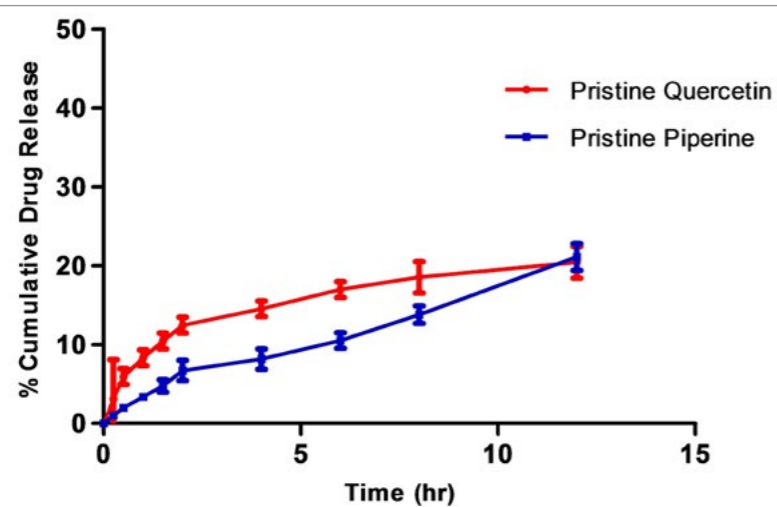


Lipidarchitectonics mediated Nanomedicines

Scientific Highlights (2020-2021)

1. Nanostructured Lipid Carriers as a strategy for encapsulation of active plant constituents: Formulation and in vitro physicochemical characterizations

Two potent active plant constituents namely, quercetin and piperine having a problem with either solubility or permeability or both, and hence require an advanced lipid-mediated separate formulation system to improve their aforementioned concerns. Concerning advancement in nanoformulations, lipid-based nano-carriers systems have created their mark as a novel drug delivery system. Therefore, an advanced formulation like nanostructured lipid carriers (NLCs) has been formulated individually for both the active plant constituents/drugs through the solvent evaporation technique using high shear homogenization method followed by sonication. Compritol® 888 ATO, a solid lipid, and squalene as liquid lipid was used in their optimized ratios to formulate individual NLCs. Blank and individual drugs loaded NLCs were further characterized for their in vitro physicochemical properties. NLCs showed a negative surface charge with an average particle size below 200 nm. Electron microscopy images showed an anomalous structure of both the formulated NLCs with higher % drug encapsulation efficiency (DEE) with the desired in vitro drug release profile. In the case of quercetin-NLCs, $93.18 \pm 5.5\%$ DEE was observed followed by drug release up to $45.0 \pm 1.3\%$ within 12 hours, while piperine-NLCs showed $91.80 \pm 2.51\%$ DEE and drug release up to $38 \pm 5.2\%$ at the same time. XRD and DSC plots showed the conversion of both the drugs into an amorphous structure encapsulated in a lyophilized NLCs matrix. Finally, the safety profile for formulated NLCs was confirmed by haemolysis assay. Hence, the developed active plant constituents enriched NLCs can further be delivered separately and/or in combination, and also may further be evaluated both in vitro and in vivo means.

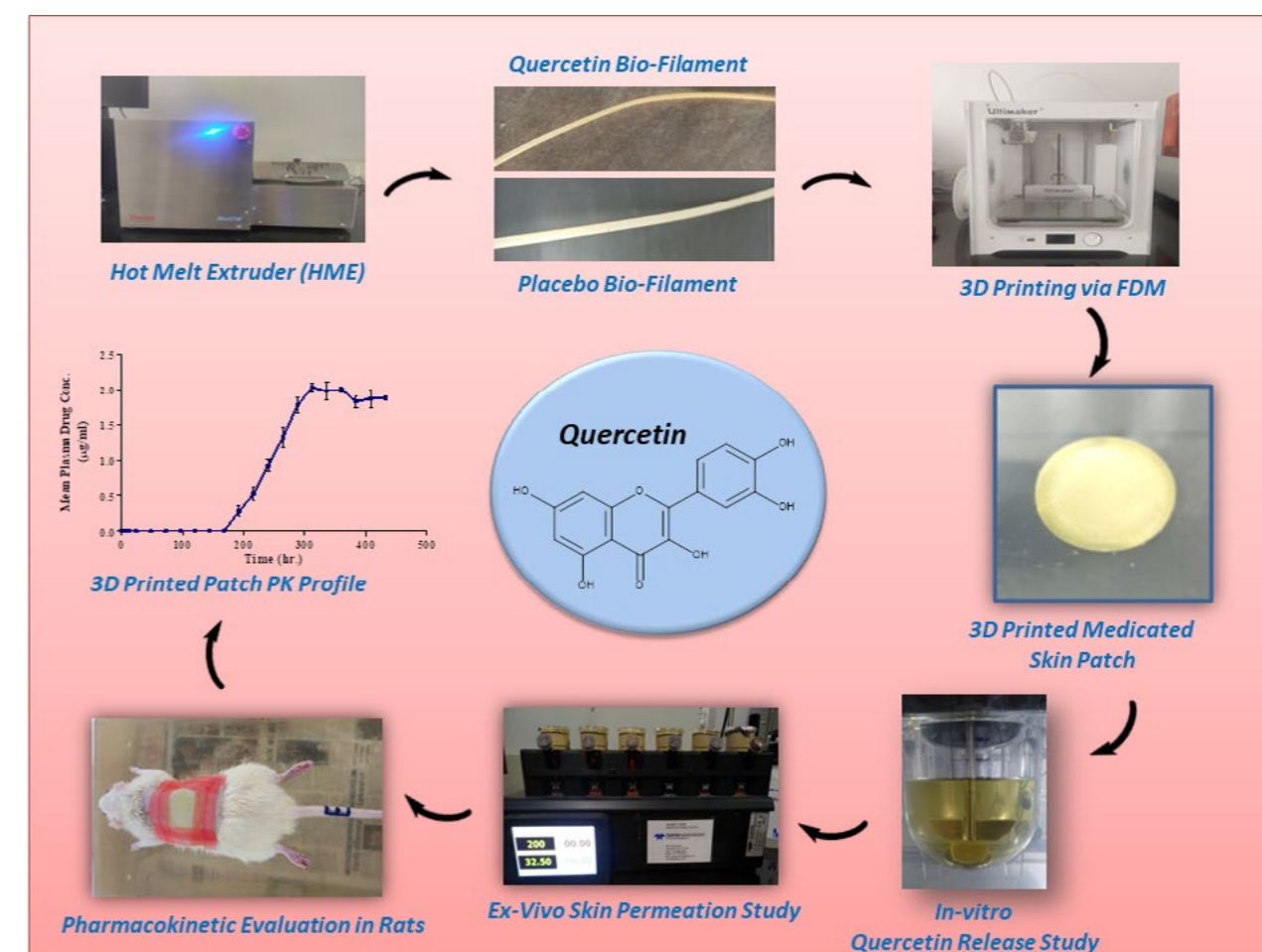


Project Funding Acknowledgement:

National Mission on Himalayan Studies [File No: GBPI/NMHS-2017-18/HSF-02], Ministry of Environment, Forest and Climate Change, Govt. of India.

2. Extruded filaments derived 3D Printed Medicated Skin Patch to Mitigate Destructive Pulmonary Tuberculosis: Design to delivery

Quercetin in combination with polyvinylpyrrolidone (PVP) was found to limit the spreading of necrosis to unaffected tissues in tuberculosis-infected mice. Therefore, we hypothesized that 3D printed medicated skin patch incorporated with a quercetin-PVP combination would provide an appropriate therapeutic drug concentration with desired sustained release profile. We fabricated quercetin-PVP extruded-filaments by hot-melt extrusion (HME) technique along with Eudragit® RSP0 and tri-ethyl citrate and further printed it to make medicated skin patches using fused deposition modeling (FDM) based 3D Printing technology. Various characterizations were performed to optimize the 3D printed patch formulation. Patch formulation has been optimized for several characterization parameters and was further assessed using SEM, DSC, and XRD studies to confirm the conversion of crystalline quercetin into an amorphous form. Finally, the pharmacokinetic profile of an optimized patch was studied in rats showing prolonged Tmax, lowered Cmax, and reduced fluctuations in plasma concentrations till 18 days with single skin application of 3D printed medicated patch. Overall data confirmed the feasibility of developing 3D printed medicated skin patches to provide plasma levels for continued 18 days in rats after a single application.



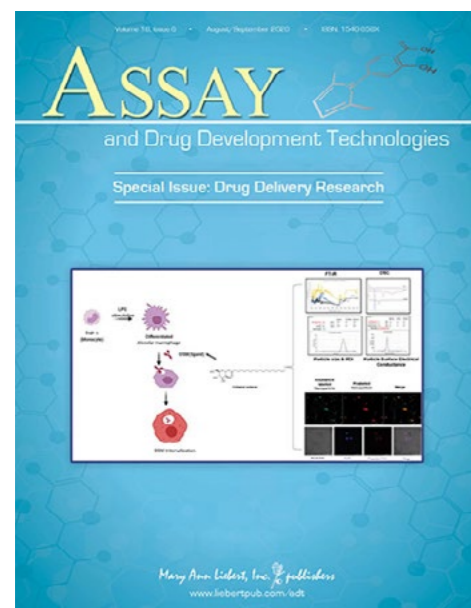
Project Funding Acknowledgement:

Science and Technology (S&T) Division, Assam Science Technology and Environment (ASTE) Council by Department of Science & Technology (DST), Government of Assam

under the scheme Innovation, Technology Generation, and Awareness (ITGA)-2019 scheme vide sanction letter no. ASTEC/S&T/1614/8/2018-19/1151 for the project titled "Medicated skin patch to mitigate destructive pulmonary tuberculosis in six districts of Assam".

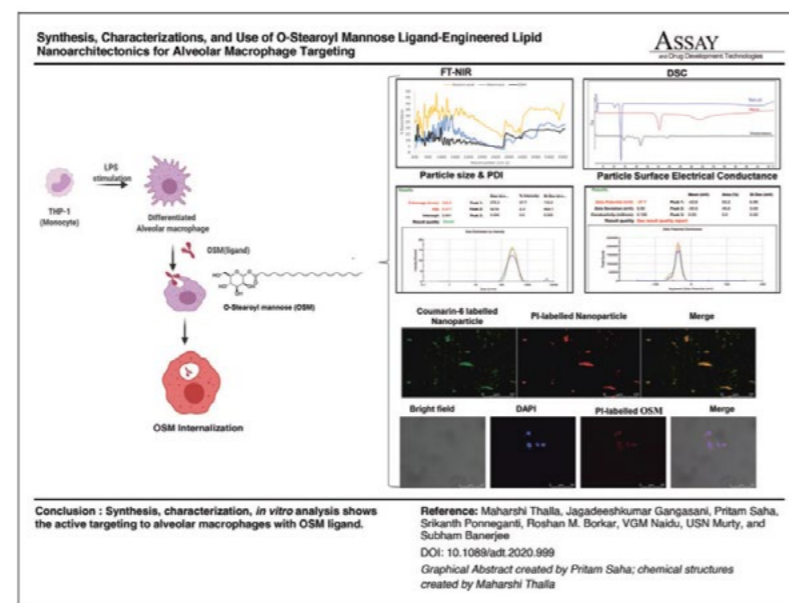
3. Pharmacoengineered lipid core-shell nanoarchitectonics to enhance macrophages uptake for potential translational therapeutic outcome.

The main challenging aspect in the management of Tuberculosis diseases is effective alveolar macrophages targeting. Macrophage mannose receptor plays a predominant role in stimulating immune systems by tuberculosis pathogen. Our earlier in silico computational studies revealed that O-stearoyl mannose (OSM) possesses a higher affinity with macrophage mannose receptors. Therefore, keeping this in view, we developed OSM with the association of stearic acid and D-mannose and as initial reactants by the esterification process in the presence of potassium carbonate. Preliminary confirmation of reaction was assessed with Thin-layer Chromatography (TLC) experimentation, whereas further confirmation followed by in vitro characterisation with several analytical experimental tools such as Differential Scanning Calorimetry (DSC), Fourier Transform Near-Infrared (FT-NIR) and Electrospray Ionization (ESI)-assisted Mass Spectrometry (MS) which confirms the formation of the OSM. This synthesised, and well-characterised OSM as a ligand was then incubated with surface engineered lipid nanoarchitectonics to get OSM ligand-engineered lipid nanoarchitectonics and earlier explored for its safety study through haemolysis assay and potential in vitro triggering efficiency in human alveolar macrophages (THP-1 cells) to validate its active targeting efficiency.



Selected Front Cover Page (2020)

ASSAY & Drug Dev. Tech., Mary Ann Liebert Inc., NY, USA.



Project Funding Acknowledgement:

Early Career Research Award in Engineering Sciences [File No: ECR/2018/000143/ES] by Science and Engineering Research Board (SERB), Ministry of Science and Technology, Government of India, New Delhi.

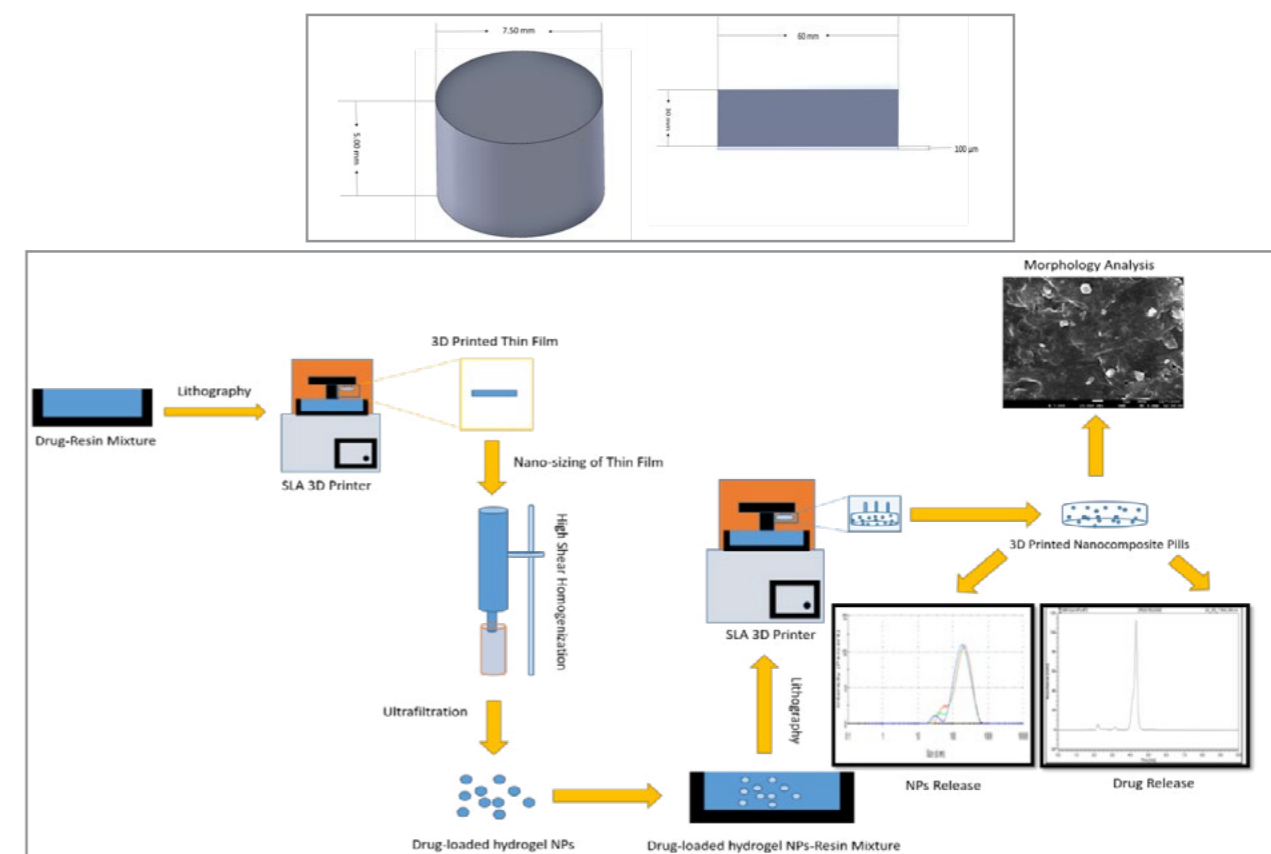
4. National Centre for Pharmacoengineering for designing innovative delivery strategies:

The "National Centre of Pharmacoengineering (NCPE)" prime objective is to be a National Center of excellence (state-of-the-art infrastructure) in promoting high standard cutting edge pharmaceutical engineering and translational biomedical research through the dissemination of advanced pharmaceutical knowledge for the ultimate benefit of the society and pharmaceutical industries with particular emphasis on the North-east region of our country. The center will also promote an effective translational route for fundamental and applied findings into routine industrial applications through a multidisciplinary approach, combining novel delivery strategies, novel technological innovation, implementation and translational.

PROJECT - 01

Stereolithography Assisted Additive Manufacturing of 3D Printed Nanocomposite drug delivery system for Customized Drug Delivery

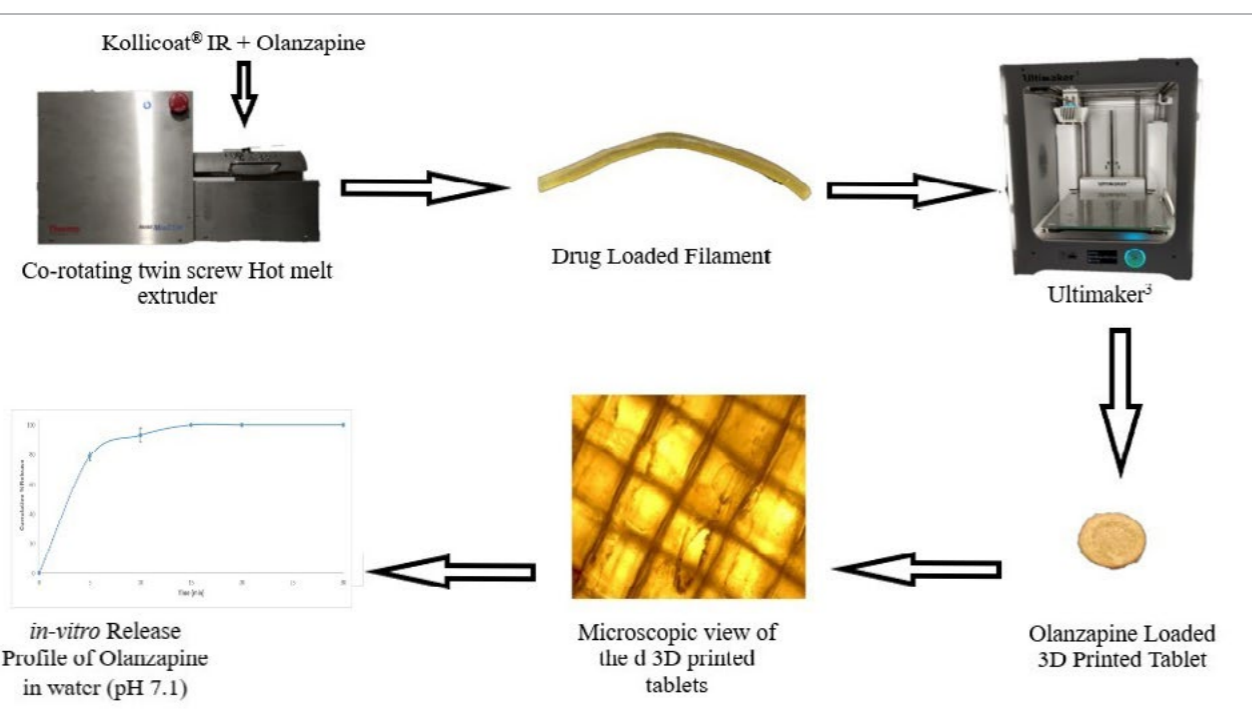
An attempt was made to utilise SLA to develop BBR-loaded hydrogel nanoparticles (BBR-NPs) as well as unit dose nanocomposite monoliths. In this regard, a BBR-loaded biodegradable resin composed of poly (ethylene glycol) diacrylate (PEGDA) as a photo-cross-linkable monomer and poly (ethylene oxide) (PEO) as a swelling aid was used to yield ultrathin films (100 μm) through SLA. Further, upon size reduction and ultrafiltration, BBR-NPs were obtained. The BBR-NPs were further dispersed into the resin, and SLA was utilised to obtain a nanocomposite drug delivery system. The pharmaceutical performances of the prepared units were evaluated.



PROJECT - 02

3D printing of immediate-release tablets containing olanzapine by filaments extrusion

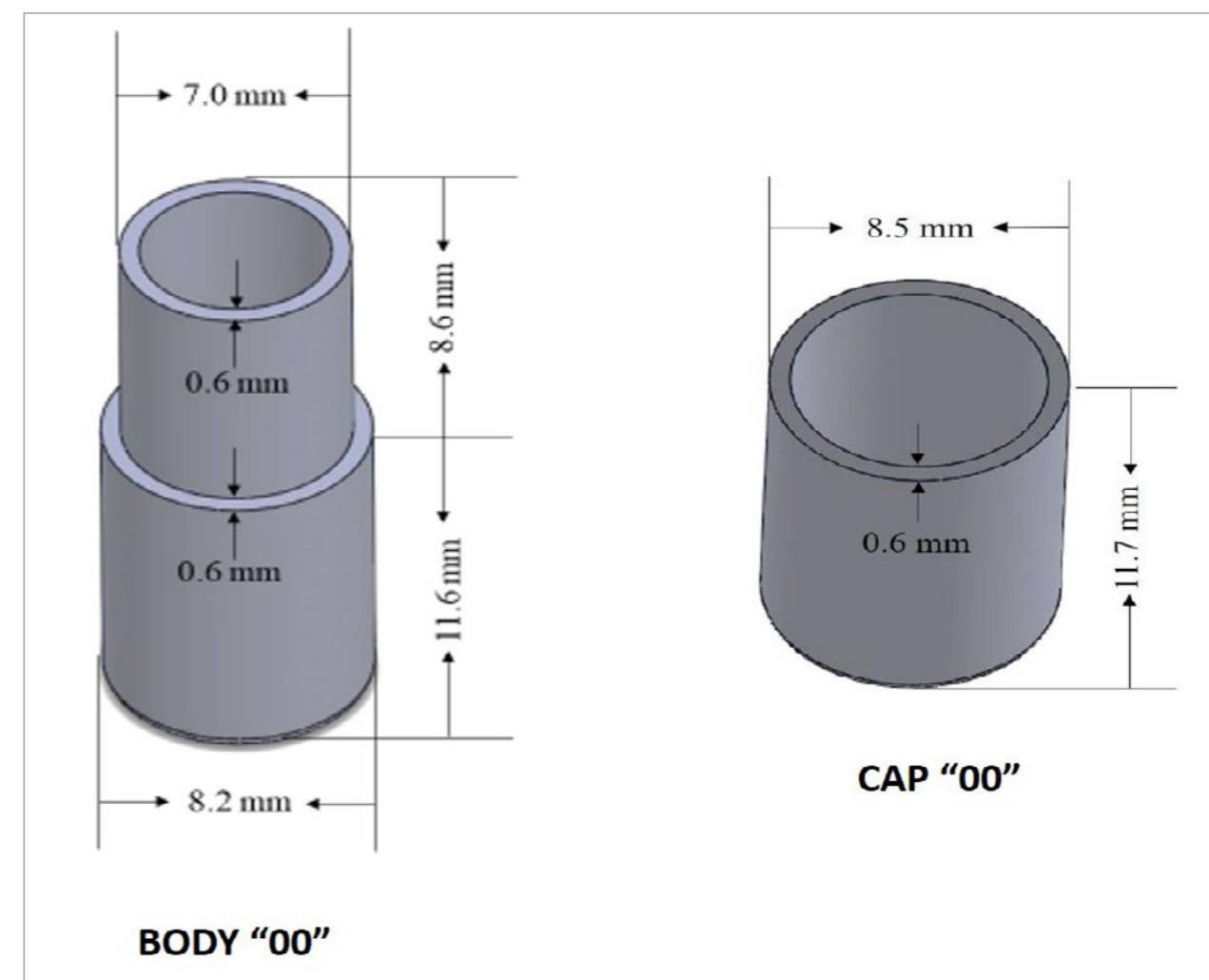
Hot-melt extrusion (HME) is coupled with fused deposition modelling (FDM) mediated 3D printing to demonstrate additive manufacturing to fabricate immediate release (IR) prototypes of olanzapine with the aim of enhanced solubility using a fast-disintegrating polymer (Kollicoat® IR). Drug-polymer solubility and interaction parameters were estimated by Hansen solubility parameters and Hildebrand-Scott equation. The obtained values signified drug-polymer miscibility. The detailed in-vitro physicochemical evaluations of the developed filament through HME and its derived 3D printed tablet by FDM technique were assessed thoroughly by several analytical means such as light microscopy, DSC, XRD, FT-IR, SEM, etc. The average disintegration time of this developed 3D printed IR tablet was found to be 63.33 (± 3.6) sec complying with the USP limit. Additionally, in-vitro dissolution study data revealed almost close correlations, and both showed 100% of drug release within 15 minutes, thus complying with the definition of IR tablet. Thus, this study demonstrates the feasibility of directly using olanzapine-Kollicoat® IR through the HME process without the addition of any plasticizers, organic solvents, etc. and coupling of HME with 3D printing technology allowing prototypes of IR tablet of olanzapine.



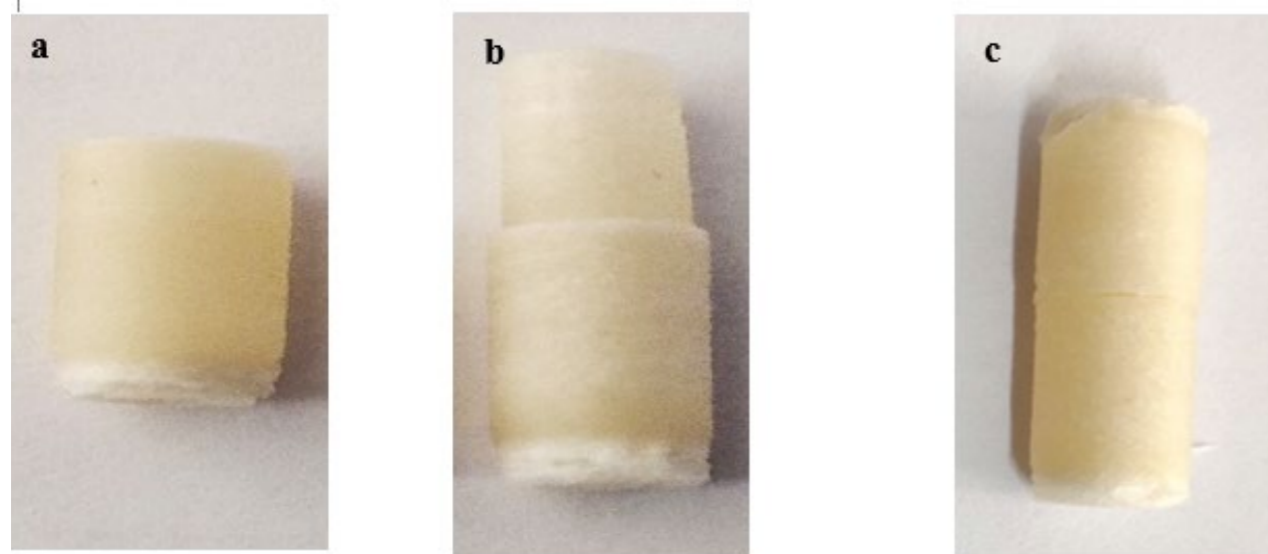
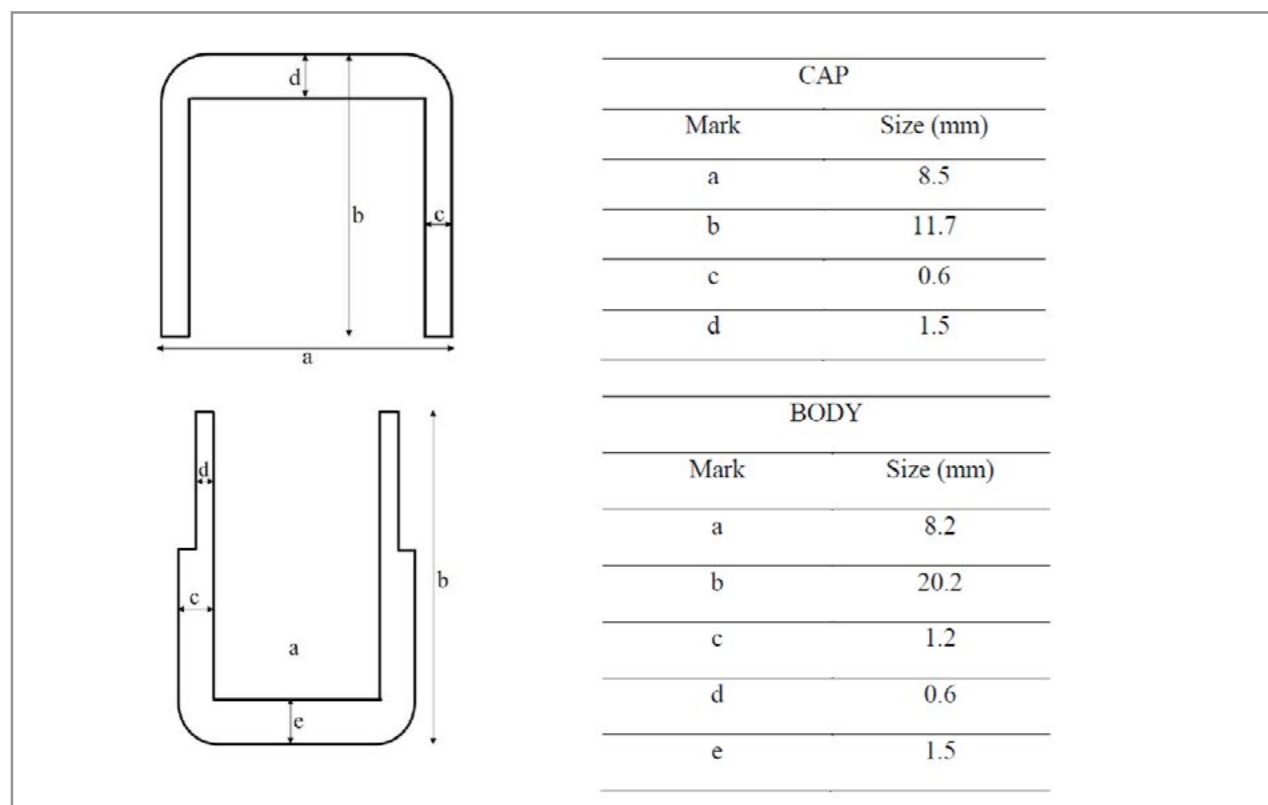
PROJECT - 03

Computer-aided design (CAD) & Prototyping of hollow capsular device for diverse drug release characteristics

This research focuses on the extrusion of a brittle, tacky, cationic copolymer i.e., Eudragit® E-100, and its subsequent printing of a hollow capsular device from the extruded filament for the delivery of drugs to the G.I compartment. With a specific ratio of talc and triethyl citrate, Eudragit® E 100 was extruded via hot-melt extrusion (HME) process. DSC and FTIR studies confirmed there was no thermal degradation of the polymer during extrusion and alteration of any primary functional groups, respectively. A fused deposition modeling (FDM) 3D printer was used to print the capsule in two parts, i.e., body and cap. The printed capsules were evaluated for dimension, weight variation, and morphology determination. Berberine chloride (BBR) was selected as a model drug for the in vitro evaluation of the printed capsule. Printed hollow capsular device showed both soluble and swellable behavior in gastric and intestinal pH, respectively. This indicates the potential application of this printed capsular device for stomach-specific drug delivery, but challenging to achieve intestinal-specific delivery as this capsule erodes in gastric pH. Therefore, Eudragit® L 100-55 was chosen as an enteric polymer to coat and diversify the intestinal specific drug release characteristics of the Eudragit® E-100 derived 3D printed hollow capsular device. In addition, the bitter taste of BBR is also masked by filling into this hollow capsular device.



CAD design of the hollow capsular device both cap and body with dimensions.



3D printed hollow capsular device (a) cap, (b) body, and (c) assembled capsular devices.

Project Funding Acknowledgement:

National Facility (State-of-the-art infrastructure) project entitled "Establishment of a National Centre of Pharmacoengineering for designing innovative delivery strategies to fight neglected diseases" vide File No: VI-D&P/646/2018-19/TDT by the Drugs and Pharmaceuticals Research Programme (DPRP), Department of Science & Technology (DST), Ministry of Science and Technology, Government of India.

Research Group



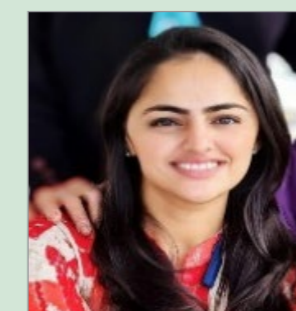
Peeyush Kumar Sharma

Ph.D. (IIT-Ropar), M. Pharm (Pharmaceutics).
Research Associate (RA)
National Centre for Pharmacoengineering (NCPE, 2019-22)

Doctoral Fellows



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(2018-21)



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(2019-22)



Maharshi Thalla
(2019-22)



Dinesh Choudhury
(2019-22)



Tukaram Karanwad
(2020-25)

Post-graduate Students



Purushottam Suryavanshi
(2019-21)



Vivek Yadav
(2019-21)



Department of Pharmacology and Toxicology

Overview

Preclinical research involving animals plays a paramount role in drug discovery and to improve the well-being of humans. In every area of drug discovery programme (from low molecular weight synthetic molecules to high molecular weight recombinant proteins or complex herbal mixtures) research with animals are essential to evaluate the efficacy, safety, toxicity and pharmacokinetic parameters. This department emphasizes an integrated view of experimental pathology, pharmacology and physiology, in order to work towards a better understanding of how the human body functions and to alleviate human diseases. This department has state of the art preclinical facility to cater the need of the R & D organizations and pharmaceutical industries.

Thrust areas of research

The Department of Pharmacology and Toxicology teach and research the physiological, pharmacological, toxicological, and nutritional basis of disease and therapeutics. Our diverse faculty's cutting-edge research spans following areas:

- Cancer and its complications
- Inflammatory diseases: Rheumatoid arthritis, Ulcerative colitis and psoriasis
- Respiratory diseases: Asthma, COPD and Lung fibrosis
- Neurodegenerative diseases: Parkinson's, Epilepsy, Alzheimer's disease
- Fibrotic disorders like renal fibrosis, hepatic fibrosis
- Cardio-Renal Pharmacology
- Diabetes and its complications mainly nephropathy, cardiomyopathy and neuropathy
- Infectious diseases: Malaria
- Toxicological studies as per OECD guidelines

Facilities available

- Central Animal house facility according to CPCSEA norms for in-vivo pharmacological screening including nude mice facility
- Full-fledged Mammalian tissue culture facility
- Biochemical and molecular pharmacology laboratory facility
- In-vitro and in-vivo imaging facilities.
- Natural product Extraction and isolation facility
- Instruments pertaining to Pharmacological screening of various activities viz pain, inflammation, cardiovascular, pulmonary, renal, tumour, neurobehavioral, haematology etc

Faculty



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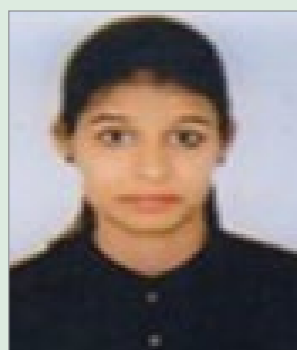
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Research Associate



Dr. Dinesh Mohan K
Research Associate





Dr. VGM Naidu, Ph. D

Associate Professor & In-charge
Department of Pharmacology and Toxicology

Research Areas:

- Cancer Biology and its complications,
- Pulmonary pharmacology
- Inflammatory diseases

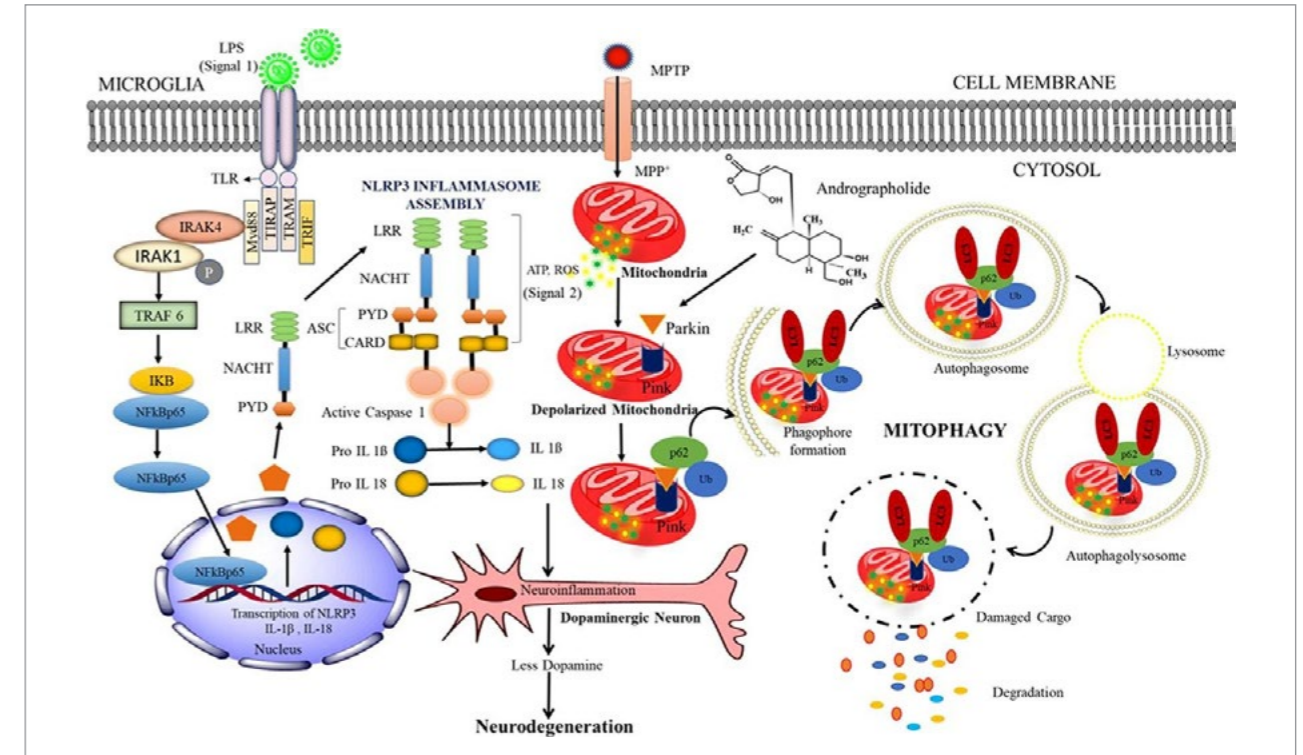
Scientific Highlights:

Andrographolide suppresses NLRP3 inflammasome activation in microglia through induction of parkin-mediated mitophagy in in-vitro and in-vivo models of Parkinson disease.

Brain Behav Immun. 2021 Jan; 91:142-158. doi: 10.1016/j.bbi.2020.09.017 (IF 7.2)

Abstract:

Cellular communication linking microglia activation and dopaminergic neuronal loss play an imperative role in the progression of Parkinson's disease (PD); however, underlying molecular mechanisms are not precise and require further elucidation. NLR Family Pyrin Domain Containing 3 (NLRP3) inflammasome activation is extensively studied in context to microglial activation and progressive dopaminergic neuronal loss in PD. Several pathophysiological factors such as oxidative stress, mitochondrial dysfunction impaired mitophagy plays a crucial role in activating NLRP3 inflammasome complex. Hence, regulation of microglial activation through mitophagy could be a valuable strategy in controlling microglia mediated neurodegeneration. In this study we have developed a model of inflammasome activation by combining LPS with a mitochondrial complex-I inhibitor MPP+. The idea of using MPP+ after priming mouse microglia with LPS was to disrupt mitochondria and release reactive oxygen species, which act as Signal 2 in augmenting NLRP3 assembly, thereby releasing potent inflammatory mediators such as active interleukin-1 beta (IL-1 β) and IL-18. LPS-MPP+ combination was seen to impaired the mitophagy by inhibiting the initial step of autophagosome formation as evidenced by protein expression and confocal imaging data. Treatment with Andrographolide promoted the parkin-dependent autophagic flux formation in microglia; resulting in the removal of defective mitochondria which in turn inhibit NLRP3 inflammasome activation. Additionally, the neuroprotective role of Andrographolide in inhibiting NLRP3 activation together with salvage ATP level via promoting parkin-dependent mitophagy was seen in the substantial nigra par compacta (SNpc) region of mice brain. Furthermore, Andrographolide rescued the dopaminergic neuron loss and improved the behavioural parameters in animal model. Collectively, our results reveal the role of mitophagy in the regulation of NLRP3 inflammasome by removing defective mitochondria. In addition, andrographolide was seen to abate NLRP3 inflammasome activation in microglia and rescue dopaminergic neuron loss.



Hispolon inhibits RANKL induced osteoclast differentiation in vitro

Immunology Letters Volume 231, March 2021, Pages 35-42, <https://doi.org/10.1016/j.imlet.2021.01.003> (IF 3.6)

Abstract

Hispolon (HISP) is a bioactive compound isolated from *Phellinulinteus*. It has various pharmacological activities, including antioxidant, anti-inflammatory, and anti-cancer. However, its anti-osteoclastogenic activity has not yet been reported. Hence, in the current study, we have explored the anti-osteoclastogenic activity of HISP and elucidated the molecular mechanisms. HISP inhibited the RANKL induced differentiation of RAW 264.7 cells into osteoclasts in a dose-dependent manner. Mechanistic studies showed that HISP inhibited RANKL-mediated activation of NF- κ B and MAPK signaling pathways in osteoclast precursors RAW 264.7 cells. In addition, Hispolon also downregulated the expression of master transcriptional factors essential for osteoclast differentiation, such as NFATc1 and c-FOS. In conclusion, these findings establish molecular mechanisms behind the anti-osteoclastogenic activity of HISP.

Sex differences in the induction of angiotensin converting enzyme 2 (ACE-2) in mouse lungs after e-cigarette vapor exposure and its relevance to COVID-19

Journal of Investigative Medicine, 29 April 2021, dx.doi.org/10.1136/jim-2020-001768 (IF 2.3)

Abstract

The COVID-19 pandemic has affected over 114million people and has resulted in >2.5million deaths so far. Some people have greater susceptibility which influences both SARS-CoV-2 infectivity and COVID-19 severity. Smoking is associated with increased ACE-2, the receptor for SARS-CoV-2, which facilitates its entry through the lung. However, despite the widespread use of e-cigarettes, also known as 'vaping', little is known regarding the effects of vaping on ACE2 expression and how this affects SARS-CoV-2 infection. In addition, the added effect of nicotine in the vapor is also unknown. Thus, we tested whether vaping induces ACE-2 expression in the mouse lung. BALB/c

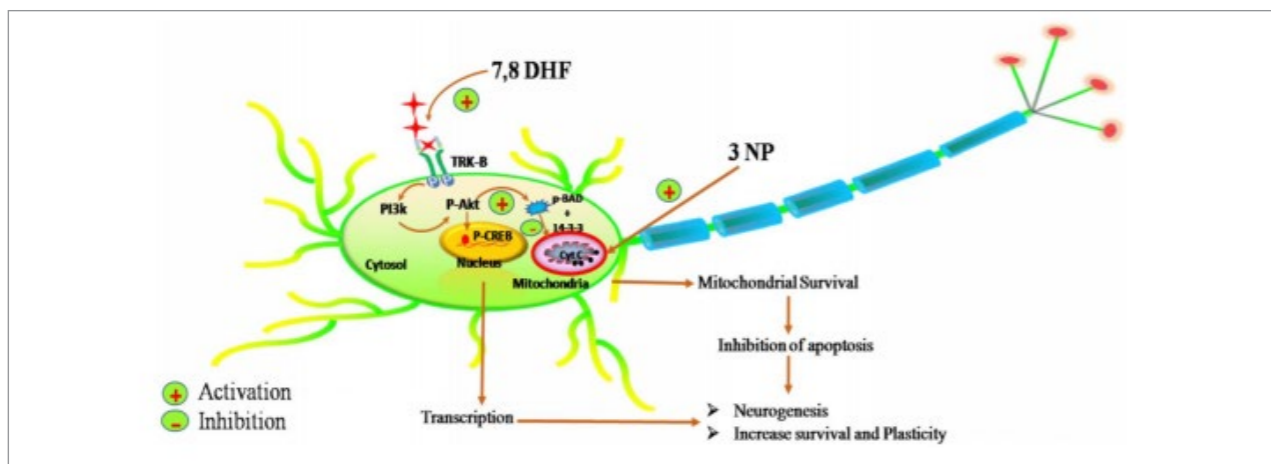
mice exposed to e-cigarette vapor (\pm nicotine) resulted in a significant increase in peribronchiolar inflammation and influx of immune cells into the airways. Vapor increased monocyte chemoattractant protein-1, interleukin 1 β , and KC levels in bronchoalveolar lavage fluid in both sexes, which were further enhanced by nicotine (whereas increase in interleukin 6 was sex and nicotine independent). The reduction in basal inspiratory capacity with vapor exposure occurred independent of sex or nicotine. The increase in methacholine-induced airway hyper-responsiveness was independent of sex; however, in female mice it was only significant in the nicotine-exposed group. Lung ACE-2 expression was increased in male mice in a nicotine-dependent manner as compared with female mice. Collectively, while vaping (\pm nicotine) induced airway inflammation and impaired lung function, the induction of lung ACE-2 occurred to a significantly greater degree in males exposed to vapor containing nicotine as compared with females. Thus, via these effects on ACE-2 expression in the lungs and airways, vaping itself may facilitate SARSCoV-2 entry into the airways.

Potential role of TrkB agonist in neuronal survival by promoting CREB/BDNF and PI3K/Akt signaling in vitro and in vivo model of 3-nitropropionic acid (3-NP)-induced neuronal death

Apoptosis, volume 26, issue 1, 52-70, DOI: <https://doi.org/10.1007/s10495-020-01645-x> (IF 4.66)

Abstract

Striatal neurons depends on an afferent supply of brain-derived neurotrophic factor (BDNF) that explicitly interacts with tropomyosin receptor kinase B (TrkB) receptor and performs sundry functions including synaptic plasticity, neuronal differentiation and growth. Therefore, we aimed to scrutinize an active molecule that functions identical to BDNF in activating TrkB receptor and its downstream targets for restoring neuronal survival in Huntington disease (HD). Data from in vitro Neuro-2a cell line showed that treatment with 7,8-dihydroxyflavone (7,8-DHF), improved 3-nitropropionic acid (3-NP) induced neuronal death by stabilizing the loss of mitochondrial membrane potential and transiently increased the activity of cAMP-response element-binding protein (CREB) and BDNF via TrkB receptor activation. Consistent with in vitro findings, our in vivo results stated that treatment with 7,8-DHF at a dose of 10 mg/kg body weight ameliorated various behavior alterations caused by 3-NP intoxication. Further histopathological and electron microscopy evidences from striatal region of 3-NP mice brain treated with 7,8-DHF showed more improved neurons with intact mitochondria and less autophagic vacuoles. Protein expression analysis of both in vitro and in vivo study showed that 7,8-DHF promotes neuronal survival through upregulation and phosphorylation of phosphatidylinositol 3-kinase (PI3K) and Akt at serine-473/threonine-308). Akt phosphorylation additionally phosphorylates Bad at serine-136 and inhibits its translocation to mitochondria thereby promoting mitochondrial biogenesis, enhanced ATP production and inhibit apoptosis mediated neuronal death. These aforementioned findings help in strengthening our hypothesis and has come up with a novel neuroprotective mechanism of 7,8-DHF against 3-NP induced neuronal death.

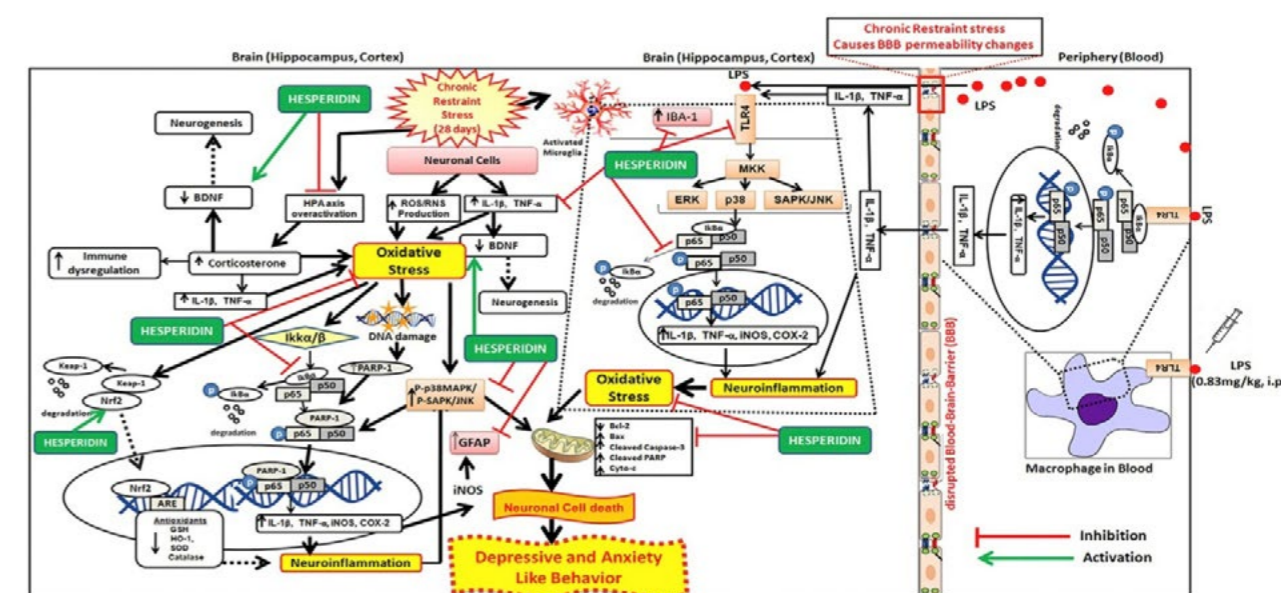


Hesperidin alleviates chronic restraint stress and lipopolysaccharide-induced Hippocampus and Frontal cortex damage in mice: Role of TLR4/NF- κ B, p38 MAPK/JNK, Nrf2/ARE signaling

Neurochemistry International Volume 140, November 2020, 104835 (IF 3.7)

Abstract

Stress and lipopolysaccharide (LPS) animal models are used for screening antidepressants and anxiolytic drugs. However, the lacunae for their combination (Restraint stress; RS and LPS) impacting inflammation, apoptosis and antioxidant signaling have not been explored. The present study investigated RS + LPS-induced neurobehavioral and neurochemical anomalies in hippocampus (HIP) and frontal cortex (FC) of mice. Furthermore, citrus-derived flavanone glycoside (Hesperidin; HSP) neuroprotective ability was also confirmed in this model. The male Balb/c mice were given RS (for 28 days) and LPS administration (single dose, 0.83 mg/kg, i.p.) on 28th day. RS + LPS challenged caused neurobehavioral deficits in mice as evaluated over elevated plus maze (EPM), open field test (OFT), light-dark box test, tail suspension test (TST), forced swimming test (FST), sucrose preference test (SPT). Moreover, RS + LPS caused alteration via enhanced oxido-nitrosative stress, proinflammatory cytokines level (serum, HIP, FC), lower antioxidants (GSH, SOD, CAT), increased IBA-1, GFAP, TLR4/NF- κ B, p38MAPK/JNK while decreased Nrf2/BDNF/HO-1 expression in HIP and FC of mice. The 21 days (8-28th day), HSP (50 and 100 mg/kg, p.o.) treatment significantly alleviated the anxiety and depressive-like behavior and reversed neurochemical, histopathological changes. HSP exerted the neuroprotective effect via its anti-inflammatory, anti-apoptotic, antioxidant and neurogenesis potential in treating psychiatric illness association with other diseases.



Ameliorative effect of *Dillenia indica* fruits against doxorubicin-induced cardiomyocyte toxicity

ADV TRADIT MED (ADTM) (2020). <https://doi.org/10.1007/s13596-020-00510-1> (IF 1.3)

Drug-induced cardiotoxicity is a significant concern in cancer patients, and therefore cardio-oncology is gaining more attention. Doxorubicin (Dox) is a potent anticancer drug used against various malignancies, with cardiotoxicity as a dose-limiting factor. Although the mechanism of Dox-mediated cardiotoxicity is not fully understood, it is thought to encompass oxidative stress during the therapy leading to cardiotoxicity in cancer patients. Several oxidative stress-induced diseases and drug-induced toxicities can be effectively ameliorated using bioactive plant constituents. *Dillenia indica* (DI) is one such plant belonging to the family Dilleniaceae and is used as an ethno-medicinal agent for the treatment of various oxidative stress-mediated diseases like diabetes and cancer. In this study, we have evaluated the protective effect of the hydroalcoholic extract of *Dillenia indica* fruits (HADI) against the Dox-induced cardiomyocyte toxicity. The HADI was further evaluated for its efficacy in a Dox-induced cardiotoxicity models. Antioxidant assays (ABTS and DPPH) revealed a strong antioxidant potential of HADI. In vitro assay results indicated that pre-treatment with HADI had shown protective activity and reduced the ROS generation in H9c2 cell line. Non-invasive methods like high-frequency ultrasonography and electrocardiography were applied to evaluate the real time cardiac parameters. It was also found that pre-treatment with HADI restored functional parameters like ejection fraction, stroke volume as well as elevation of the T wave induced by Dox. Whereas the Dox treated mice had elevated levels of cardiac functional enzymes like creatinine kinase (CK-MB) and lactate dehydrogenase indicating the severity of cardiomyocyte toxicity. The results indicated that HADI pre-treatment has significantly reduced the upregulated enzyme levels. Taken together, our findings indicated that HADI ameliorated the Dox-induced cardiomyocyte toxicity by modulating the upregulated reactive oxygen species.

Photo-Electro Active Nanocomposite Silk Hydrogel for Spatiotemporal Controlled Release of Chemotherapeutics: An In Vivo Approach toward Suppressing Solid Tumor Growth (Collaborative work with IITG)

Published in ACS Appl Mater Interfaces. 2020 Jun 24;12(25):27905-27916. (IF 9.2)

Abstract

Conventional systemic chemotherapeutic regimens suffer from challenges such as nonspecificity, shorter half-life, clearance of drugs, and dose-limiting toxicity. Localized delivery of chemotherapeutic drugs through noninvasive spatiotemporally controllable stimuli-responsive drug delivery systems could overcome these drawbacks while utilizing drugs approved for cancer treatment. In this regard, we developed photoelectro active nanocomposite silk-based drug delivery systems (DDS) exhibiting on-demand drug release in vivo. A functionally modified single-walled carbon nanotube loaded with doxorubicin (DOX) was embedded within a cross-linker free silk hydrogel. The resultant nanocomposite silk hydrogel showed electrical field responsiveness and near-infrared (NIR) laser-induced hyperthermal effect. The remote application of these stimuli in tandem or independent manner led to the increased thermal and electrical conductivity of nanocomposite hydrogel, which effectively triggered the intermittent on-demand drug release. In a proof-of-concept in vivo tumor regression study, the nanocomposite hydrogel was administered in a minimally invasive way at the periphery of the tumor by covering most of it. During the 21-day study, drastic tumor regression was recorded upon regular stimulation of nanocomposite hydrogel with simultaneous or individual external application of an electric field and NIR laser. Tumor cell death marker expression analysis uncovered the induction of apoptosis in tumor cells leading to its shrinkage. Heart ultrasound and histology revealed no cardiotoxicity associated with localized DOX treatment. To our knowledge, this is also the first report to show the simultaneous application of electric field and NIR laser in vivo for localized tumor therapy, and our results suggested that such strategy might have high clinical translational potential.

Local administration of 4-Thiouridine, a novel molecule with potent anti-inflammatory properties, protects against experimental colitis and arthritis

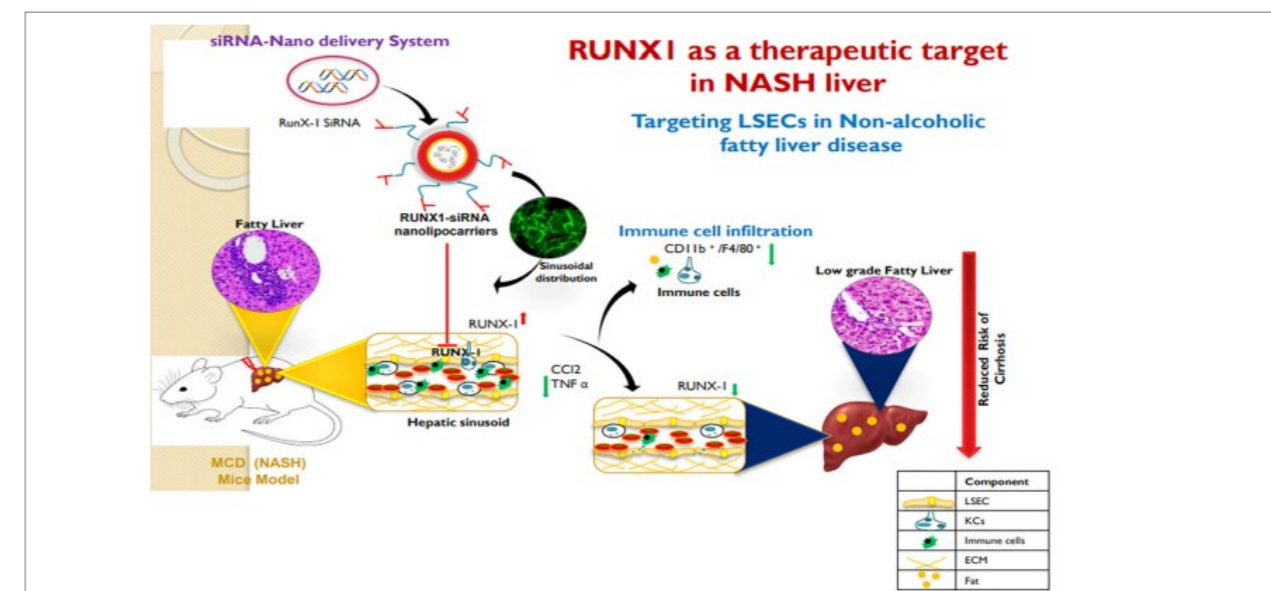
Int Immunopharmacol 2020 Aug;85:106598. (IF 3.9)

Abstract

Previous studies in a rat model of Sephadex induced lung inflammation showed that 4-Thiouridine (4SU), a thiol substituted nucleoside, was very effective in reducing edema, leukocyte influx and TNF levels in bronchoalveolar lavage fluid. However, little is known about the factors and mechanisms underlying these effects. In the present study, we have used two separate mouse models of chronic inflammation, a model of dextran sulphate sodium (DSS) induced colitis and a model of antigen induced arthritis, to evaluate the anti-inflammatory effect of 4-thiouridine. We have analyzed a broad spectrum of inflammatory mediators in order to delineate the mechanisms behind a potential anti-inflammatory effect of 4SU. Colitis was induced in C57BL/6 mice by administration of 3.5% DSS in drinking water for 5 days and the potential anti-colitic effect of 4SU was assessed by monitoring the disease activity index (DAI), measurement of colon length and histopathological analysis of colon tissue. We analyzed tissue myeloperoxidase (MPO) activity, serum pro-inflammatory cytokines (IL-1 β , IL-6 and TNF), mRNA and protein expression of pro-inflammatory cytokines, COX-2, and NF- κ B activity in colitis tissue. Intracolonic administration of 4SU (5 mg/kg & 10 mg/kg.) significantly inhibited MPO activity and reduced the levels of pro-inflammatory cytokines (IL-1 β , IL-6 and TNF) as well as COX-2. Further, NF- κ B activation was also blocked by attenuating the phosphorylation of I κ B kinase (IKK α/β) in DSS-induced colitis tissues. Arthritis was induced by intra-articular injection of mBSA in the knee of NMRI mice pre-immunized with mBSA and 4SU was administered locally by direct injection into the knee joint. The antiarthritic potential of 4SU was calculated by histopathological scores and histochemical analysis of joint tissue. Further, immunohistochemistry was used to study inflammatory cell infiltration and expression of cytokines and adhesion molecules in the synovium. Local administration of 50-100 mg/kg 4SU at the time of arthritis onset clearly prevented development of joint inflammation and efficiently inhibited synovial expression of CD18, local cytokine production and recruitment of leukocytes to the synovium. Taken together, our data clearly demonstrates a potent anti-inflammatory effect of 4SU in two experimental models. In conclusion 4SU could be a new promising candidate for therapeutic modulation of chronic inflammatory diseases like ulcerative colitis and arthritis.

Liver sinusoidal endothelial cell-specific RUNX-1 gene knockdown decreases hepatic inflammation and myeloid cells infiltration in pre-clinical animal models non-alcoholic steatohepatitis (Collaborative work with ILBS, New Delhi).

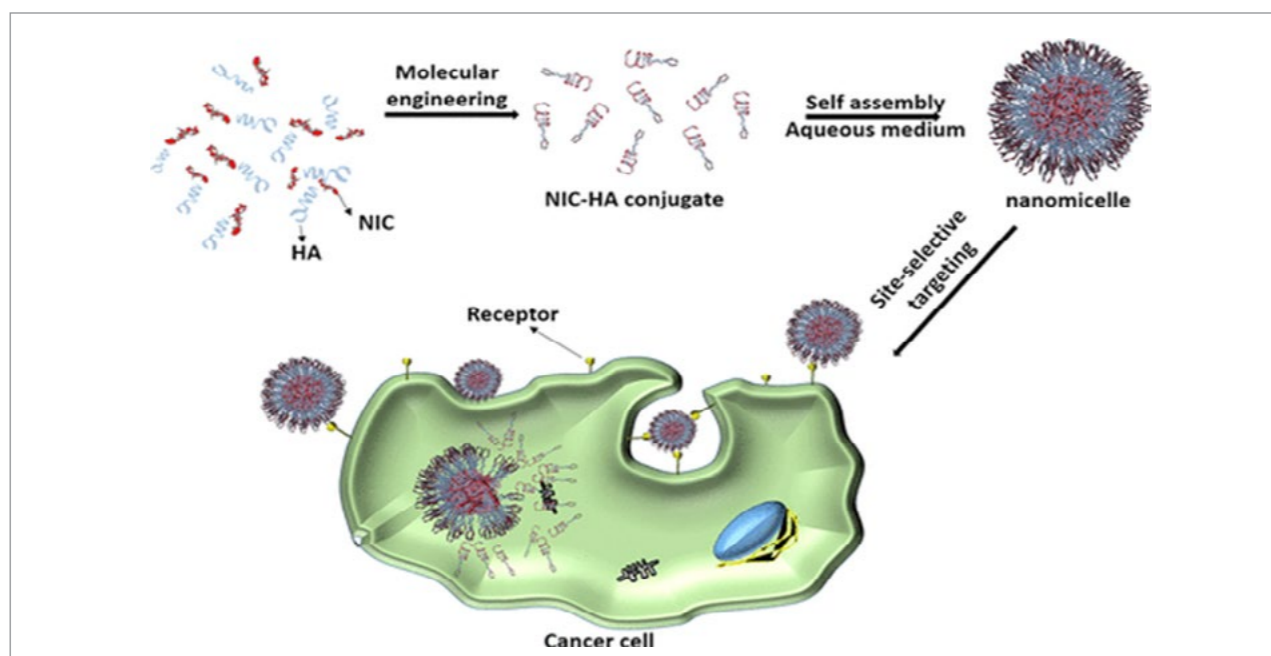
Journal of Hepatology 73:S659-S660 DOI:10.1016/S0168-8278(20)31780-3 (IF 17)



Characteristics of Molecularly Engineered Anticancer Drug Conjugated Organic Nanomicelles for Site-Selective Cancer Cell Rupture and Growth Inhibition of Tumor Spheroids (Collaborative work with IIT Mumbai).

ACS Appl. Bio Mater. 2020, 3, 10, 7067–7079 (IF 3.2)

Site-selective uptake and specific biodistribution of chemotherapeutic drugs are essential prerequisites for targeted cancer therapy. Especially, antibody and peptide conjugated drugs have been attempted as localized therapeutic agents. However, the characteristics of drug conjugated nanosystems are less explored, which are limited with their toxicity, low therapeutic efficacy, complicated synthesis, and high costs. Herein, we report a biocompatible (about 95%) molecularly engineered anticancer drug conjugated nanomicelles (~200 nm in size) for site-selective CD44 overexpressed cancer cell rupture and tumor growth inhibition. Microscopic analysis demonstrates the distinct visualization of organic-organic interfaces (~5 nm), which are corroborated with spectroscopic measurements confirmed the conjugation of niclosamide drug with hyaluronic acid (NIC-HA). Uniformly distributed hemocompatible (about 99%) organic nanomicelles exhibit the cellular membrane and cytoplasmic targeting with significant cellular rupture (IC₅₀ of 4 μM for MDA MB 231 cells) indicating their inherent targeting ability for cancer cells and cancer stem cells. An inclusive in vitro and in vivo analysis for targeted antitumor activity (HT1080 tumor xenograft model) of NIC-HA nanoconjugates (~24.6% loading) exhibited promising cancer cell death and tumor growth inhibition (60%, p < 0.05) due to STAT-3 signaling pathway inhibition and induction of apoptosis in CD44-positive triple negative breast cancer cells.

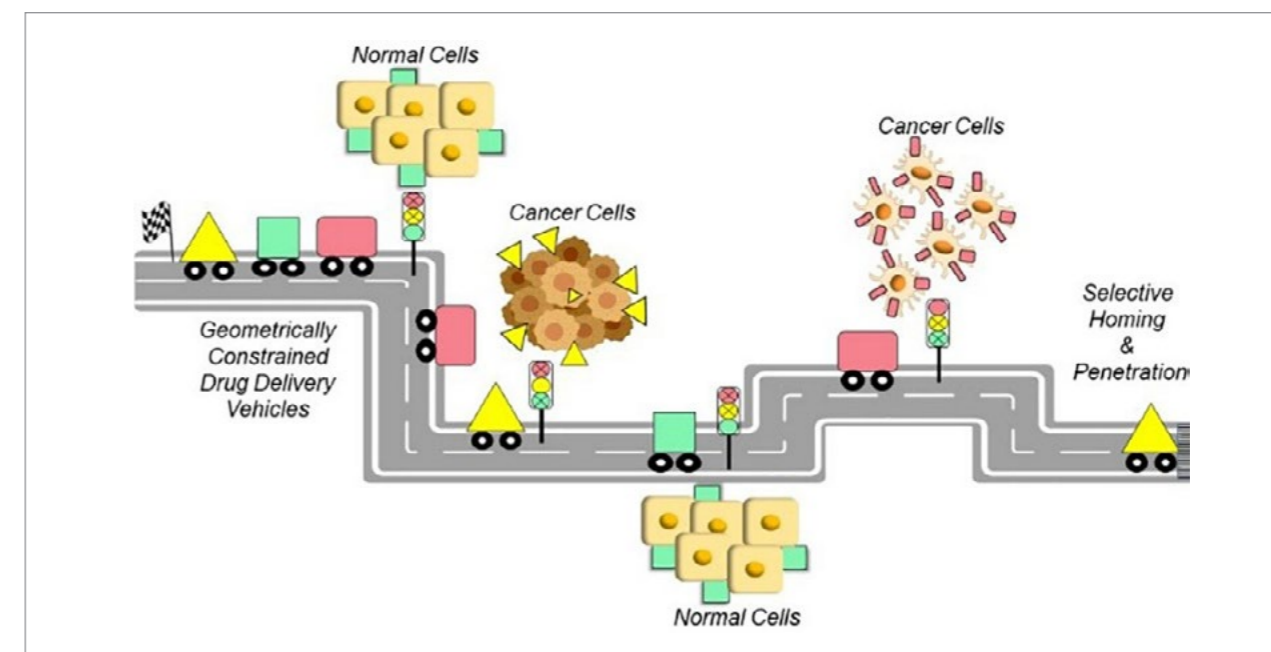


Geometry encoded functional programming of tumor homing peptides for targeted drug delivery

Journal of Controlled Release Volume 333, 10 May 2021, Pages 16-27, <https://doi.org/10.1016/j.jconrel.2021.03.010> (IF 9.77) (Collaborative work with IIT-Guwahati) (IF 9.77)

Abstract

Poly-peptide molecules have shown promising applications in drug delivery and tumor targeting. A series of tumor homing peptides were designed by exhaustively sampling low energy geometrical basins of amino acids at specific sites of a peptide molecule to induce a conformational lock. This peptide library was pruned to a limited set of eight molecules, employing electrostatic interactions, docking, and molecular dynamics simulations. These designed and optimized peptides were synthesized and tested on various cell lines, including breast cancer (MDA-MB-231), cervical cancer (HeLa), osteosarcoma (U2-OS), and non-cancerous mammary epithelial cells (MCF-10A) using confocal microscopy and flow cytometry. Peptides show differential uptake in cancerous MDA-MB-231, HeLa, U2-OS, and non-cancerous MCF-10A cells. Confocal imaging verified their ability to penetrate even in 3D tumorspheres of MDA-MB-231 cells. Further, experiments of mitochondrial membrane potential depolarization and Caspase-3 activation confirmed that their cytotoxic effects are by apoptosis. Homing ability of the designed peptides in in vivo system and fluorescence imaging with clinical samples of human origin have further confirmed that the in vitro studies are qualitatively identical and quantitatively comparable in their ability to selectively recognize tumor cells. Overall, we present a roadmap for the functional programming of peptide-based homing and penetrating molecules that can perform selective tumor targeting.



Research Scholars



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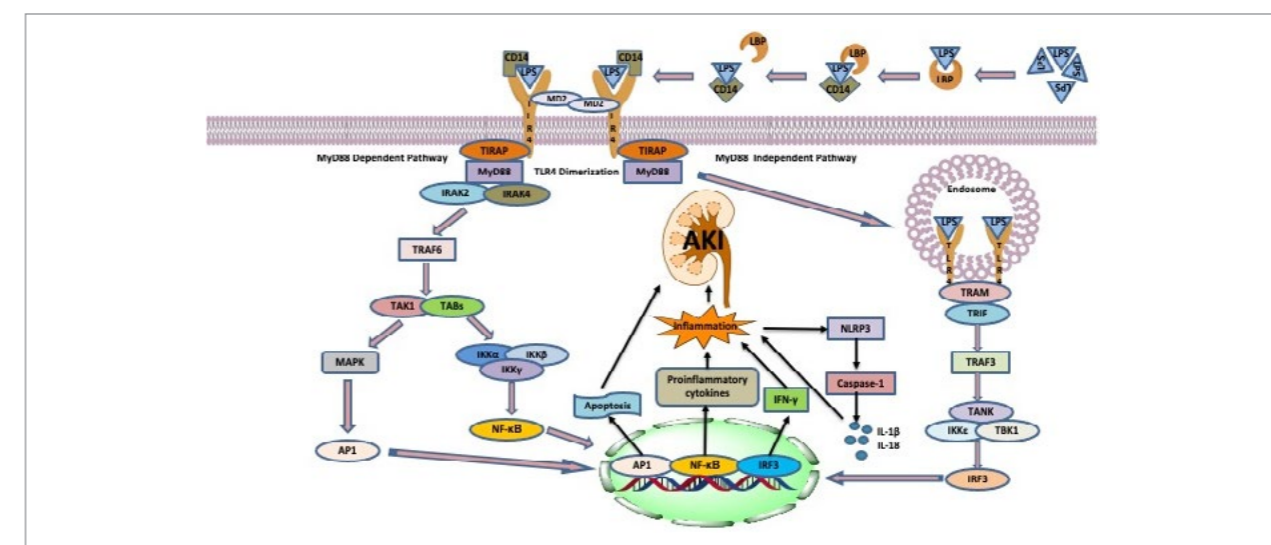
Research Areas:

Cardio-renal pharmacology, Free Radical Biology, Inflammation, Diabetes and its complications. The goal of my research is to identify the molecular basic of disease and to develop novel therapeutics/ phytopharmaceuticals/ nutraceuticals for the prevention and/or treatment of disease/disorders.

Scientific Highlights:

Highlight 1: Role of TLR4 on acute kidney injury

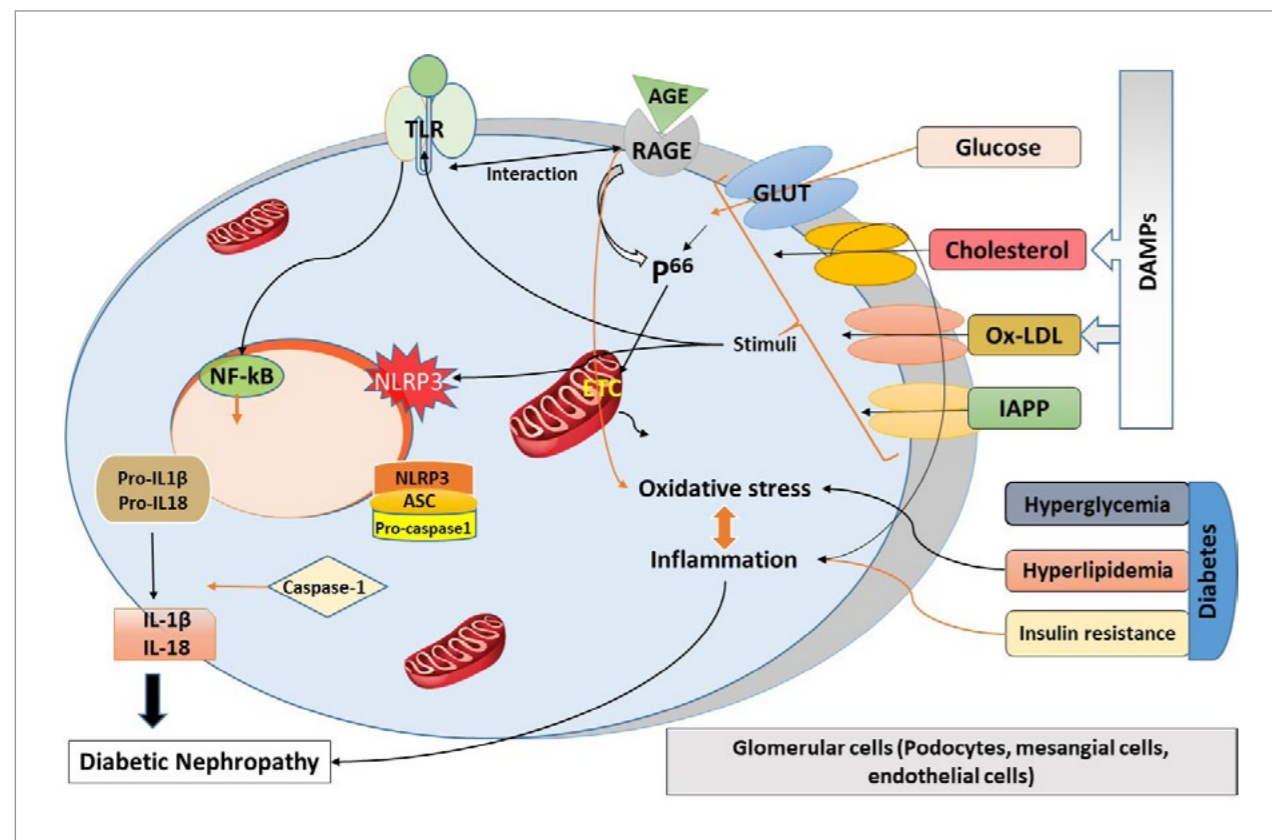
Acute kidney injury (AKI) is a progressive renal complication which significantly affects the patient's life with huge economic burden. Untreated acute kidney injury eventually progresses to a chronic form and end-stage renal disease. Although significant breakthroughs have been made in recent years, there are still no effective pharmacological therapies for the treatment of acute kidney injury. Toll-like receptor 4 (TLR4) is a well-characterized pattern recognition receptor and increasing evidence has shown that TLR4 mediated inflammatory response plays a pivotal role in the pathogenesis of acute kidney injury. The expression of TLR4 has been seen in resident renal cells, including podocytes, mesangial cells, tubular epithelial cells and endothelial cells. Activation of TLR4 signaling regulates the transcription of numerous pro-inflammatory cytokines and chemokines, resulting in renal inflammation. Therefore, targeting TLR4 and its downstream effectors could serve as an effective therapeutic intervention to prevent renal inflammation and subsequent kidney damage. Furthermore, we have highlighted several compounds of natural and synthetic origin, which have the potential to avert the renal TLR4 signaling in preclinical AKI models and have shown protection against AKI.



[Jha AK, Gairola S, Kundu S, Doye P, Syed AM, Ram C, Murty US, Naidu VGM, Sahu BD. Toll-like receptor 4: An attractive therapeutic target for acute kidney injury. Life Sciences, 271, 119155 (2021)].

Highlight 2: Role of NLRP3 inflammasomes in diabetes nephropathy

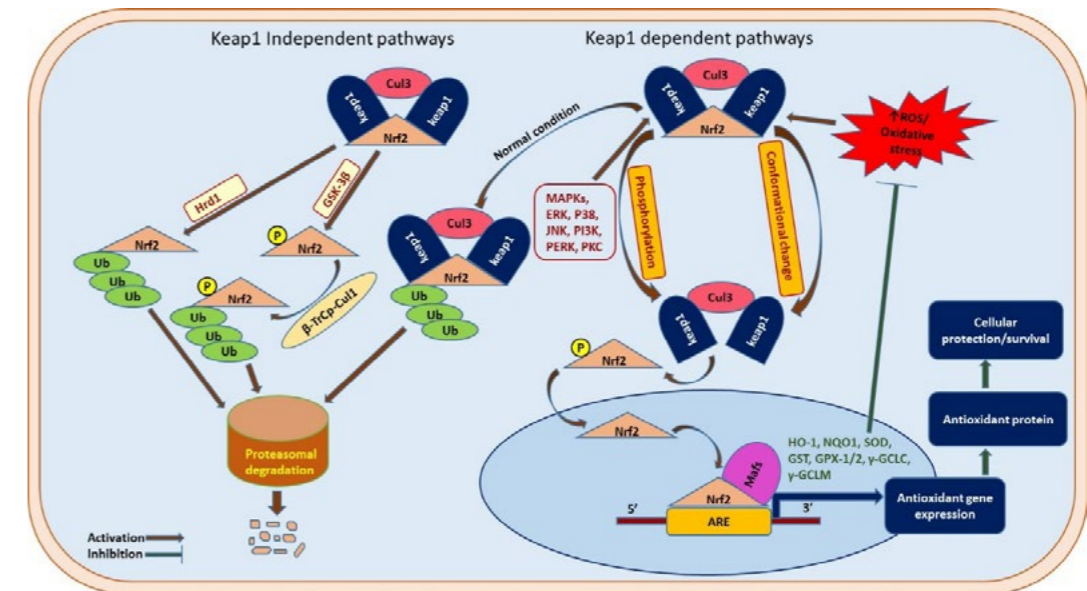
Diabetic nephropathy is the notable complication in diabetes, leading to end-stage renal disease (ESRD) and premature death. Diabetes mellitus is an increasingly prevalent disease around the globe. Abundant experimental evidence indicates that oxidative stress and inflammation are the important mediators in diabetic kidney diseases and interlinked with various signal transduction molecular mechanisms. Inflammasomes are the critical components of innate immunity and are recognized as a critical mediator of inflammation and autoimmune disorders. NOD-like receptor protein 3 (NLRP3) inflammasome is the well-characterized protein and it exhibits the sterile inflammation through the regulation of pro-inflammatory cytokines interleukin (IL)-1 β and IL-18 production in tissues. In recent years, the role of NLRP3 inflammasome in the pathophysiology of diabetic kidney diseases in both clinical and experimental studies has generated great interest and inhibition of NLRP3 inflammasome-caspase-1-IL-1 β /IL-18 axis is a promising therapeutic target for drug discovery in future.



[Ram C, Jha AK, Ghosh A, Gairola S, Syed AM, Murty US, Naidu VGM, Sahu BD. Targeting NLRP3 inflammasome as a promising approach for treatment of diabetic nephropathy: Preclinical evidences with therapeutic approaches. European Journal of Pharmacology, 885, 173503 (2020)]

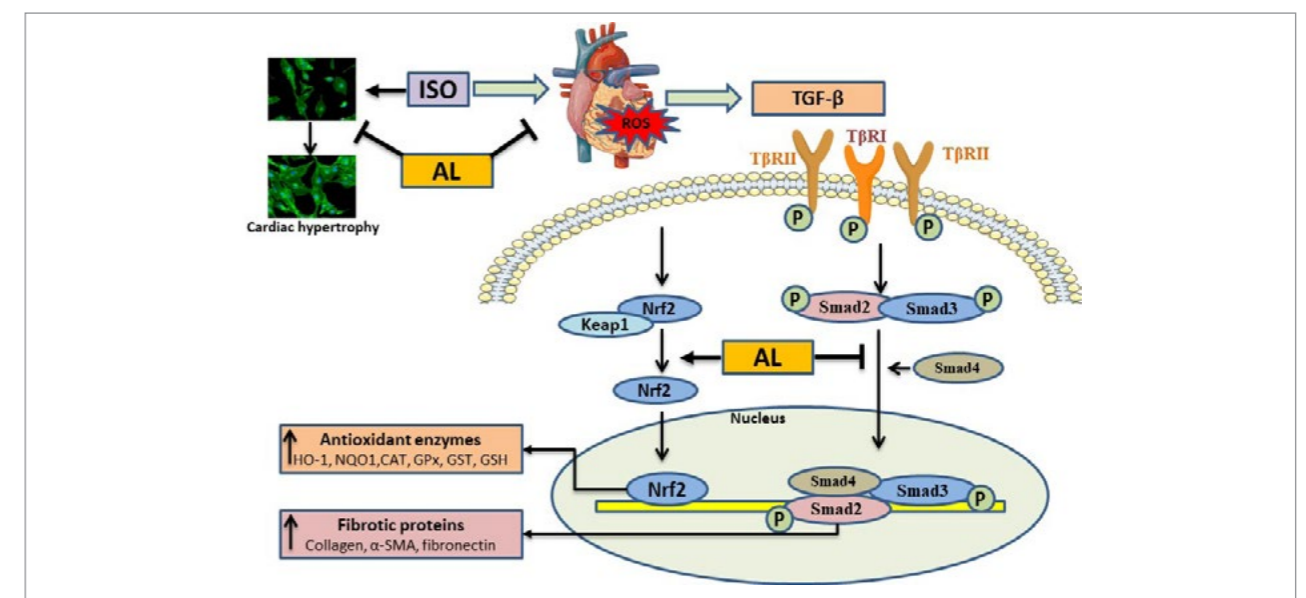
Highlight 3: Role of Nrf2/ARE signaling pathway in cardiovascular diseases

Cardiovascular diseases (CVDs) are an ever-growing problem and are the most common cause of death worldwide. The uncontrolled production of reactive oxygen species (ROS) and the activation of ROS associated various cell signaling pathways with oxidative cellular damage are the most common pathological conditions connected with CVDs including endothelial dysfunction, hypercontractility of vascular smooth muscle, cardiac hypertrophy and heart failure. The nuclear factor E2-related factor 2 (Nrf2) is a basic leucine zipper redox transcription factor, together with its negative regulator, kelch-like ECH-associated protein 1 (Keap1), serves as a key regulator of cellular defense mechanisms to combat oxidative stress and associated diseases. Multiple lines of evidence described here supports the cardiac protective property of Nrf2 in various experimental models of cardiac related disease conditions. Based on evidence from various preclinical experimental models, we have highlighted the activation of Nrf2 pathway as a budding therapeutic option for the prevention and treatment of CVDs, which needs further investigation and validation in the clinical settings.



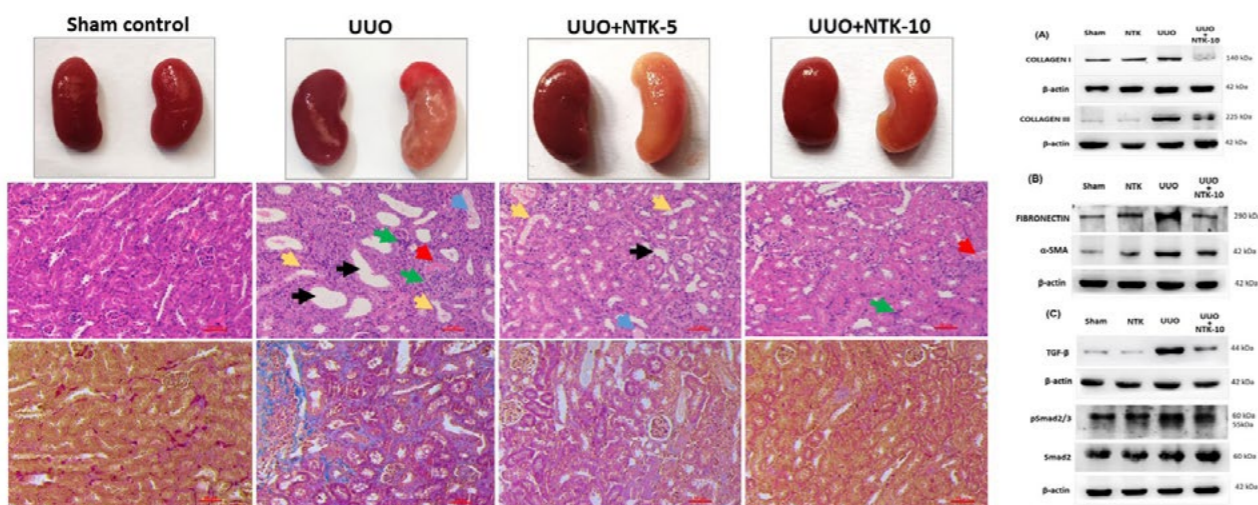
Highlight 4: Targeting oxidative stress and fibrosis for cardiac hypertrophy and adverse myocardial remodeling

Cardiac hypertrophy and associated abnormal remodelling are a major pathological feature of various cardiovascular diseases (CVD). Myocardial fibrosis and oxidative stress are responsible for the development of cardiac hypertrophy which leads to systolic and diastolic damage, followed by heart failure. Therefore, it has been suggested that agents having ameliorative effect towards oxidative stress and fibrosis may be promising candidates for the treatment of cardiac hypertrophy. We examined the beneficial effect of natural compounds (AL) in attenuating hypertrophic and adverse myocardial remodelling processes in animal models of cardiac hypertrophy induced by repeated administration of isoproterenol. Echocardiography, mRNA expression of ANP, BNP and β -MHC genes, and cross-sectional areas of cardiomyocytes were analysed to assess cardiac hypertrophy. Left ventricular heart tissue and blood samples were collected to evaluate cardiac injury markers, protein abundance, and histopathological status. Additionally, the effect of aloin (20 and 40 μ g/ml) on inhibition of ISO-induced H9c2 cardiomyoblast hypertrophic changes and the generation of reactive oxygen species was verified. Altogether, these findings substantiate that aloin attenuated ISO-induced cardiac hypertrophy and provided antifibrotic effect, thereby encouraging its potential as a promising therapeutic agent against cardiac hypertrophy and myocardial fibrosis.



Highlight 5: NTK confers antifibrotic effect by inhibiting TGFβ/pSmad2/3 signaling axis in unilateral ureteral obstruction (UUO)-induced renal fibrosis.

Chronic kidney disease (CKD) with underlying interstitial fibrosis is often associated with end-stage renal disease (ESRD). There is no existing therapeutic alternative to avert the intricate course of renal interstitial fibrosis during CKD. In the present study, we investigated the renoprotective and antifibrotic potential of NTK in an experimental model of renal fibrosis. Administration of NTK prevented the activation of the TGF-β/Smad signaling axis, the expression of ECM components in the kidneys and preserved the kidney tissue architecture.



NTK confers antifibrotic effect by inhibiting TGFβ/pSmad2/3 signaling axis in unilateral ureteral obstruction (UUO)-induced renal fibrosis



Research Scholars



Abu Mohammad Syed



Chetan Ram



Uttam kulhari

**Department of
Pharmaceutical Analysis**

Department of Pharmaceutical analysis is dealing with various aspects of drug development viz. drug degradation and impurity profiling, toxicological evaluation, bioanalytical chemistry, drug metabolism studies and analytical biotechnology. Aside this, different research groups in Pharmaceutical Analysis department are involved to explore different dimensions in advance drug discovery and development such as impurity profiling, toxicity assessment and pharmacodynamics/pharmacokinetics interaction, metabolomics, degradaomics and lipidomics etc. to obtain biochemical insights of disease progression.

Department of Pharmaceutical Analysis is well equipped with modern analytical techniques such as LC-HRMS, ICP-MS, GC-MS/HS/AS, HPLC a semi-preparative and analytical HPLC.

Expertise available from Department of Pharmaceutical Analysis

- Metabolomics and lipidomic profiling of various cancer, cardiovascular and metabolic disorder
- Enantiomeric separation of Chiral pharmaceutical compounds by using chiral chromatography technique
- Enantiomeric stability, Pharmacokinetics and Metabolic profiling of chiral drugs
- Biomonitoring of endocrine disruptors and other emerging environmental contaminants for characterizing human exposure by using LC-MS/MS and GC/MS
- Impact of aggravated environmental on stability of pharmaceuticals
- Phyto-metabolomics study of the plant from Northeast Region of India
- Analytical and bioanalytical method development and validation
- Pharmacokinetic studies of drugs and metabolites
- Identification and characterization of drug metabolites

Faculty



Dr. Radhakrishnanand P.

Associate Professor

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Research Interest:

Enantiomeric separation of Chiral pharmaceutical compounds by using analytical techniques.

Analytical and bioanalytical method development and validation

Phyto-metabolomics study of the plant from North-East Region of India

Enantioselective Pharmacodynamic and Pharmacokinetic Studies of Selected Chiral Drugs by various analytical techniques



Dr. Roshan M Borkar

Assistant Professor

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Research Interest:

Metabolomics and lipidomic profiling of various cancer, cardiovascular and metabolic disorder.

Biomonitoring of endocrine disruptors and other emerging environmental contaminants



Dr. Pawan Kumar Porwal

Assistant Professor

Email: pawan.porwal@niperguwahati.ac.in

Research Interest:

Role of Advanced glycation end-product (AGE) formation in diabetes disease nucleation. Drug degradation kinetics and stability profiling of pharmaceutical and nutraceutical using chemometric learning approaches for pattern recognition



Dr. Pramod Kumar

Assistant Professor

Email: pramodkumar@niperguwahati.ac.in

Research Interest:

Pharmacokinetic, bio-distribution and metabolite studies of pharmaceuticals.

Development of reference material of dope testing.



Dr. Radhakrishnanand. P

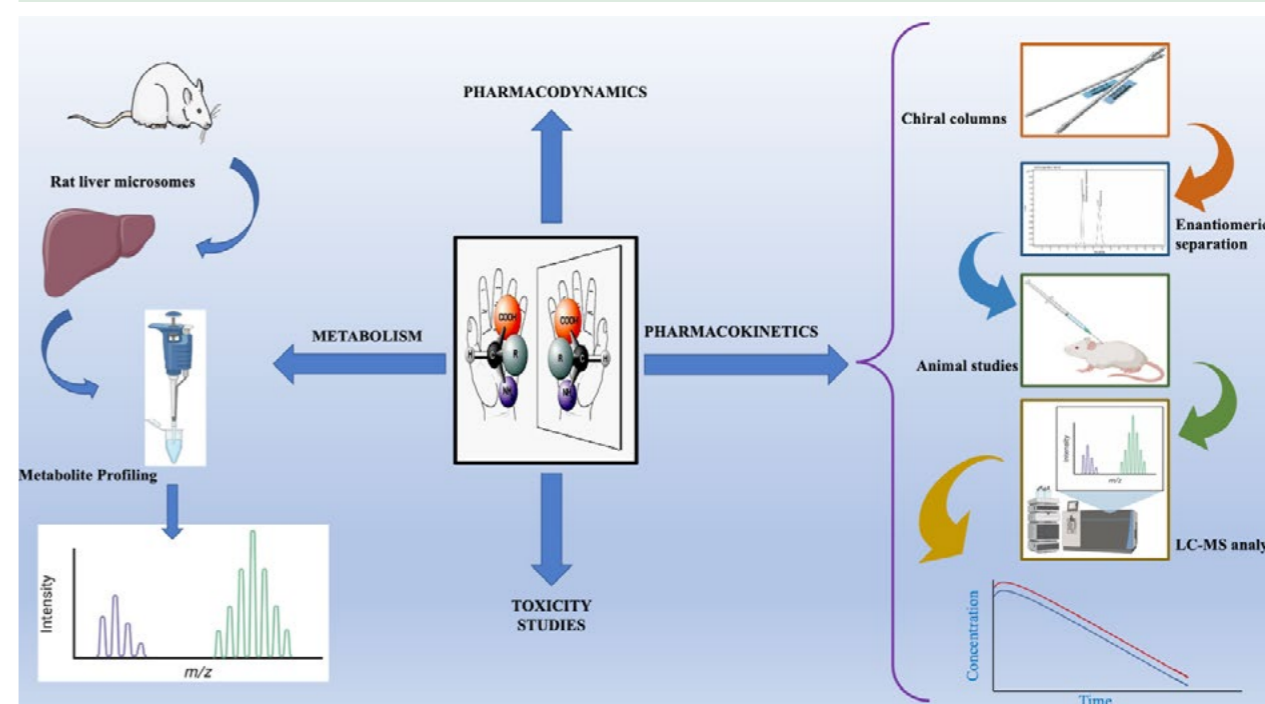
M. Sc., Ph.D.

Associate Professor & In-charge

Research Area 1

Enantioselective Pharmacodynamic and Pharmacokinetic Studies of Selected Chiral Drugs by various analytical techniques

Chiral drugs may behave differently in achiral and chiral environment. As enzymes, transporters, receptors in biological system are chiral, the isomers of the drug molecules may vary their interaction with the chiral targets which ultimately effects the distribution, efficacy, the rate and extent of metabolism, metabolites formed and adverse effects. The enantioselectivity present in drug-protein interactions are considered a determining factor that can interfere in the pharmacokinetic of the enantiomers, with consequences for therapeutic properties and toxicity levels. During the process of metabolism, differences can be found mainly during first-pass metabolism, where changes in the proportion of plasma enantiomer concentrations can occur when a drug is administered intravenously compared to the oral route. Enantiomers can be metabolized by different enzyme systems, resulting in variations in the rate of metabolic clearance. In addition, factors such as age and sex can also influence the enzyme metabolism of enantiomers. Currently our research area focus on establishing the pharmacokinetics, toxicokinetic, metabolite profiling, drug-drug, drug-transporter interaction and gender relation variations of the racemic drugs in the market.



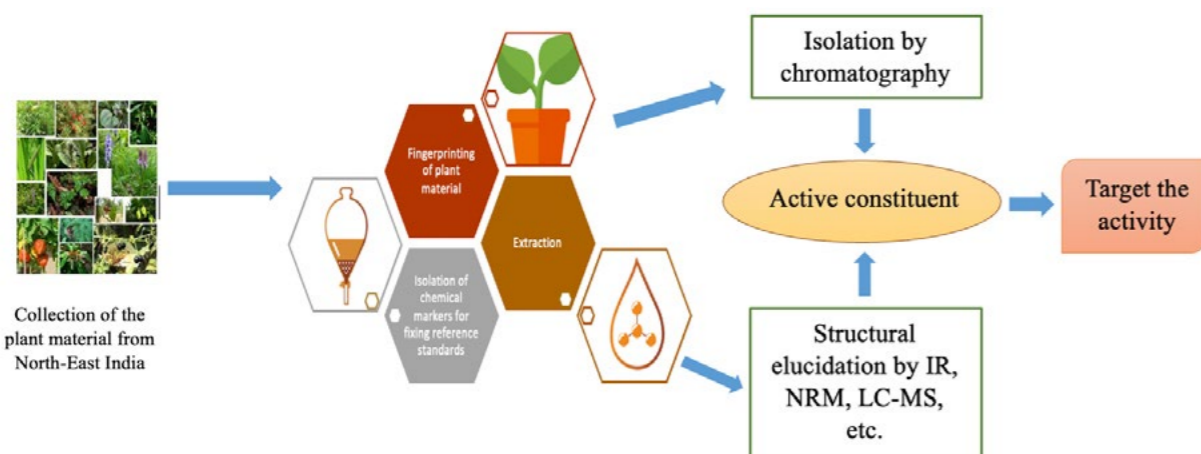
Research Area 2

Phyto-metabolomic study of the plant from North-East region of India

Consumption of herbal medicines alternative to western medicine as a natural remedy is more prevalent among 80% of the world population because of their huge availability, economic consideration, and is safe and effective than any other type of medicines. Northeast region of India has plenty of medicinal plant varieties with their medicinal values like antibacterial, antimicrobial, antiviral, antifungal, etc., and are also used in the cure of diabetes, cancer, psoriasis, tuberculosis, etc.

Metabolomics has increasingly found applications in plant biology affording researchers a better understanding of the complexity of the plant metabolic composition, metabolism, and their therapeutic activity. The workflow mainly involves extraction of the plant material followed by the identification of all possible metabolites by using GC-MS and LC-QTOF and quantification by LC-MS/MS. Then the different plant extracts will be checked for the activity in both in-vitro cell lines and in in vivo disease models. Based on the result there will be further isolation and characterization of the metabolites with good activity towards the disease conditions by using preparative HPLC and further characterization by UV, FT-IR, NMR and Mass spectrometry.

The main purpose of plant metabolomics is to study different complex plant extracts for metabolite exploration and the discovery of natural herbal products. Plant metabolomics depends on accurate and selective chemical information collection where the maximum number of detected metabolites and their molecular assignment are included.



Research Group

PhD students



Srikanth Ponneganti

PA/2019-2/002/Ph.D



VVS Prasanna Kumari Rayala

PA/2020-3/004/Ph.D



Dr. Roshan M Borkar

MS (Pharm), Ph.D.

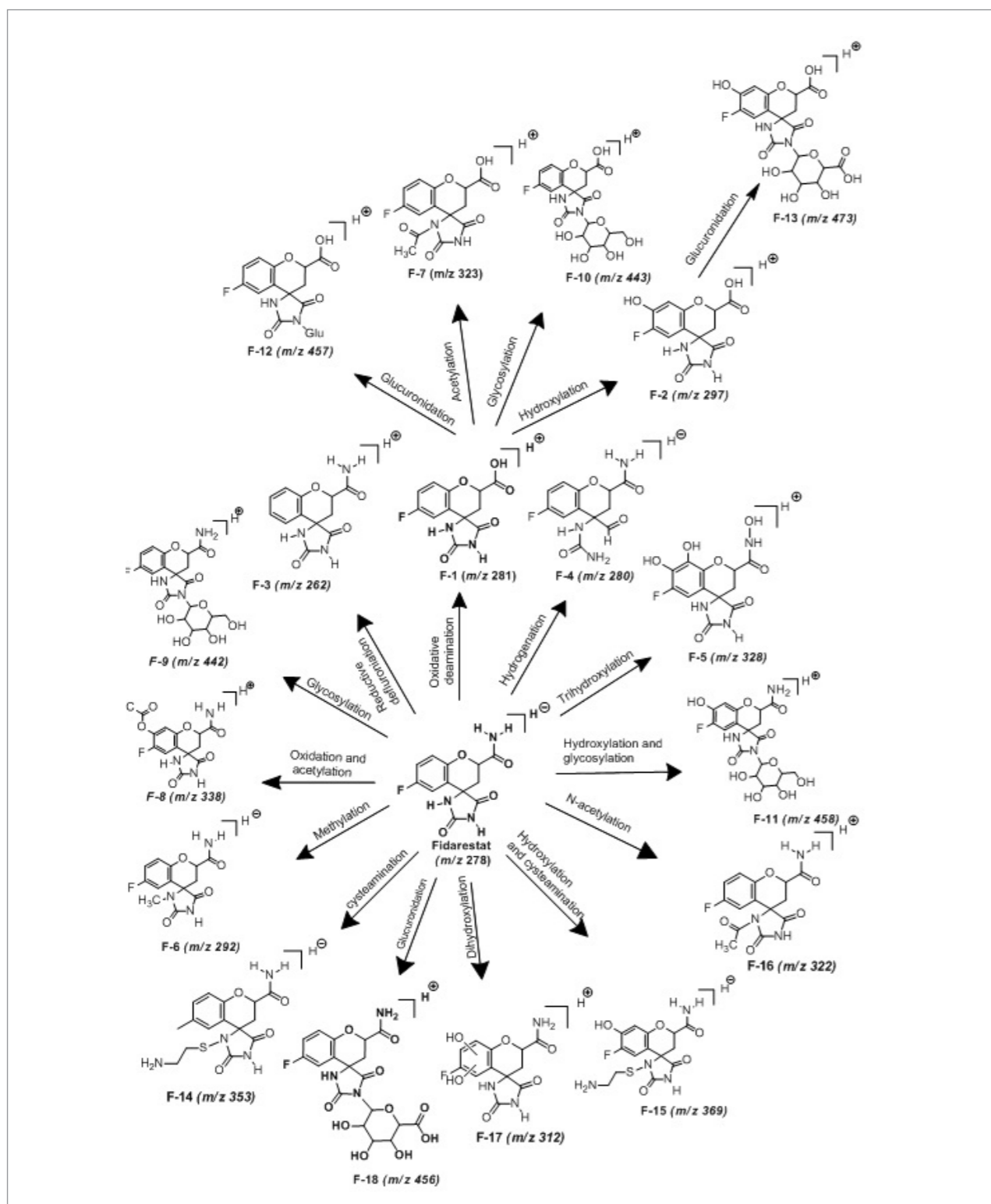
Assistant Professor

Research Area 1

Identification and characterization of in vitro and in vivo fidarestat metabolites: Toxicity and efficacy evaluation of metabolites

The progression of diabetic complications can be prevented by inhibition of aldose reductase and fidarestat considered to be highly potent. To date, metabolites of the fidarestat, toxicity, and efficacy are unknown. Therefore, the present study on characterization of hitherto unknown in vitro and in vivo metabolites of fidarestat using liquid chromatography–electrospray ionization tandem mass spectrometry (LC/ESI/MS/MS) is undertaken. In vitro and in vivo metabolites of fidarestat have been identified and characterized by using LC/ESI/MS/MS and accurate mass measurements. To identify in vivo metabolites, plasma, urine, and feces samples were collected after oral administration of fidarestat to Sprague–Dawley rats, whereas for in vitro metabolites, fidarestat was incubated in human S9 fraction, human liver microsomes, and rat liver microsomes. Furthermore, in silico toxicity and efficacy of the identified metabolites were evaluated. Eighteen metabolites have been identified. The main in vitro phase I metabolites of fidarestat are oxidative deamination, oxidative deamination and hydroxylation, reductive defluorination, and trihydroxylation. Phase II metabolites are methylation, acetylation, glycosylation, cysteamination, and glucuronidation. Docking studies suggest that oxidative deaminated metabolite has better docking energy and conformation that keeps consensus with fidarestat whereas the rest of the metabolites do not give satisfactory results. Aldose reductase activity has been determined for oxidative deaminated metabolite (F-1), and it shows an IC50 value of 0.44 μ M. The major metabolite, oxidative deaminated, did not show any cytotoxicity in H9C2, HEK, HEPG2, and Panc1 cell lines. However, in silico toxic-ity, the predication result showed toxicity in skin irritation and ocular irritancy SEV/MOD versus MLD/NON (v5.1) model for fidarestat and its all metabolites. In drug discovery and development research, it is distinctly the case that the potential for pharmacologically active metabolites must be considered. Thus, the active metabolites of fidarestat may have an advantage as drug candidates as many drugs were initially observed as metabolites.

Identification and characterization of in vitro and in vivo fidarestat metabolites: Toxicity and efficacy evaluation of metabolites. Roshan M Borkar, Shankar Gajji, Soheb A Mohammed, Mithul Srivastava, Velma Ganga Reddy, Aishwarya Jala, Shailendra Asthana, Ahmed Kamal, Sanjay K Banerjee, Srinivas Ragampeta Journal of Mass Spectrometry 56 (2), e4694, 2021



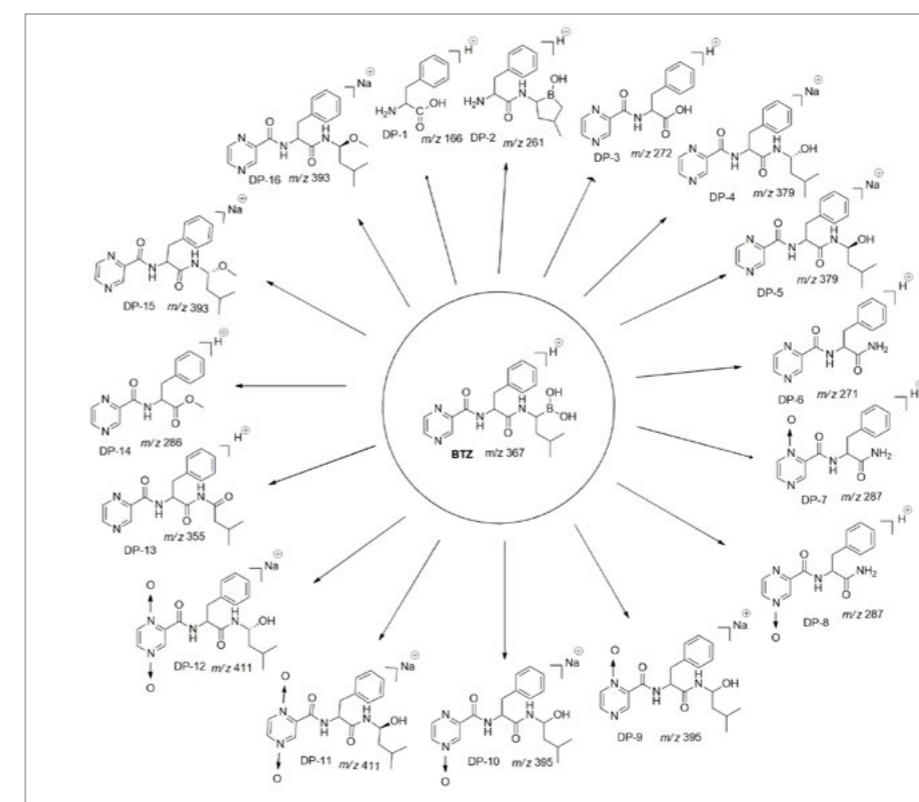
Scheme 1: Proposed in-vivo metabolic pathway of fidarestat

Research Area 2

Stress degradation study of bortezomib: Effect of co-solvent, isolation and characterization of degradation products by UHPLC-Q-TOF-MS/MS, NMR and evaluation of the toxicity of the degradation products

Bortezomib (BTZ) is a first in class, potent reversible inhibitor of proteasome used in the treatment of multiple myeloma, the second most common hematological cancers. Stress degradation studies were performed to investigate the inherent stability of the drug according to ICH recommended guidelines Q1A (R2). Stress experiments were carried out in two ways using acetonitrile and methanol as co-solvents under various conditions. A selective stability-indicating LC-MS method has been developed to separate all degradation products of the drug on Hibar-Purospher STAR, C18 (250 X 4.6mm, 5µm) column using mobile phase consisting of 0.1% formic acid and acetonitrile in gradient mode. BTZ was found to undergo degradation under acidic, basic, neutral hydrolysis and oxidative condition, whereas it was stable in other conditions. Thirteen degradation products (DP-1 to DP-13) were identified using acetonitrile as co-solvent. Additionally, three (DP-14 to DP-16) degradation products were found where methanol was used as co-solvent. A total of 16 (DP-1 to DP-16) degradation products were characterized by liquid chromatography-tandem mass spectrometry (LC-ESI-Q-TOF/MS/MS) and high-resolution mass spectrometry (HRMS). Major degradation products, DP-3, DP-6, DP-9, DP-10, DP-11 and DP-12 formed in oxidation condition were isolated using preparative HPLC and characterized by 1D and 2D NMR experiments. Further, in vitro cytotoxicity of isolated DPs was tested on normal cell lines such as CHO-K1, HEK-293 and NRK-49F by MTT assay. This study revealed that they were less toxic around 2-6 times as compared with standard control of the drug and DP-10 showed relatively more toxicity compared to other isolated DPs against rat kidney cells at 18.20µM. In silico toxicity studies suggested that BTZ and its DPs can be hepatotoxic and genotoxic resulting in severe toxicity.

Stress degradation study of bortezomib: effect of co-solvent, isolation and characterization of degradation products by UHPLC-Q-TOF-MS/MS and NMR and evaluation of the toxicity of the degradation products. Suresh Udutha, Roshan M Borkar, G Shankar, T Sony, Aishwarya Jala, E Vamshi Krishna, T Kiran Kumar, S Misra, S Prabhakar, R Srinivas New Journal of Chemistry 45 (18), 8178-8191, 2021



Scheme 1: Proposed structures of protonated degradation products of Bortezomib

Research Area 3

Bisphenols and parabens in tea bags from India and their implications for human exposure

Parabens and bisphenols have been reported as endocrine disrupting chemicals. Nevertheless, little is known about the exposure through tea bags. In this study, we determined the concentration of parabens and bisphenols in commercially available tea bags by LC-MS/MS and human dietary exposure from tea bags to these chemicals were estimated. The total concentration of parabens and bisphenols ranged from below the limit of quantification to 462.40 ng/g (mean: 116.26 ng/g and median 54.76 ng/g) and 836.90 ng/g (mean: 246.36 ng/g and median 189.77 ng/g) for inside packing cover and tea powder, respectively. The estimated daily intake (EDI; ng/kg of body weight (bw)/day) of total parabens was 27.89 and 32.97 ng/kg bw/day for male and female, respectively. The EDI for bisphenols was 334.57 ng/kg bw/day for female and 283.10 ng/kg bw/day for male. To our knowledge, this is the first study to report the occurrence of parabens and bisphenols in tea bags.

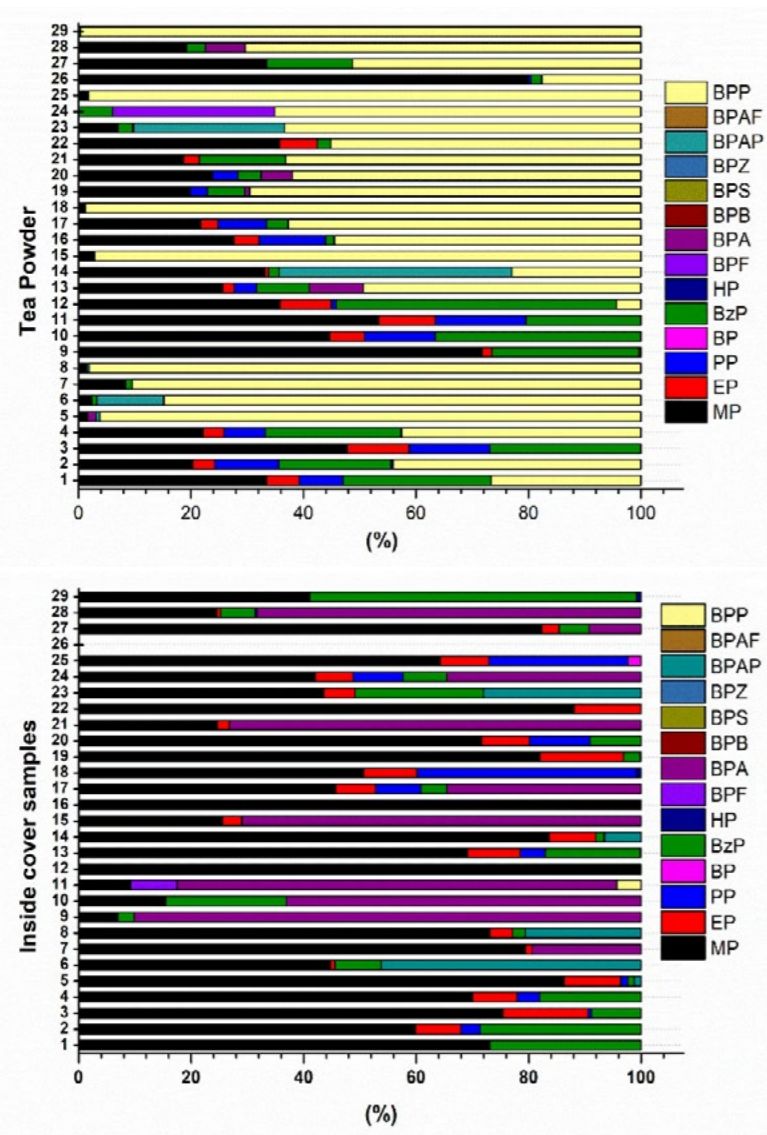
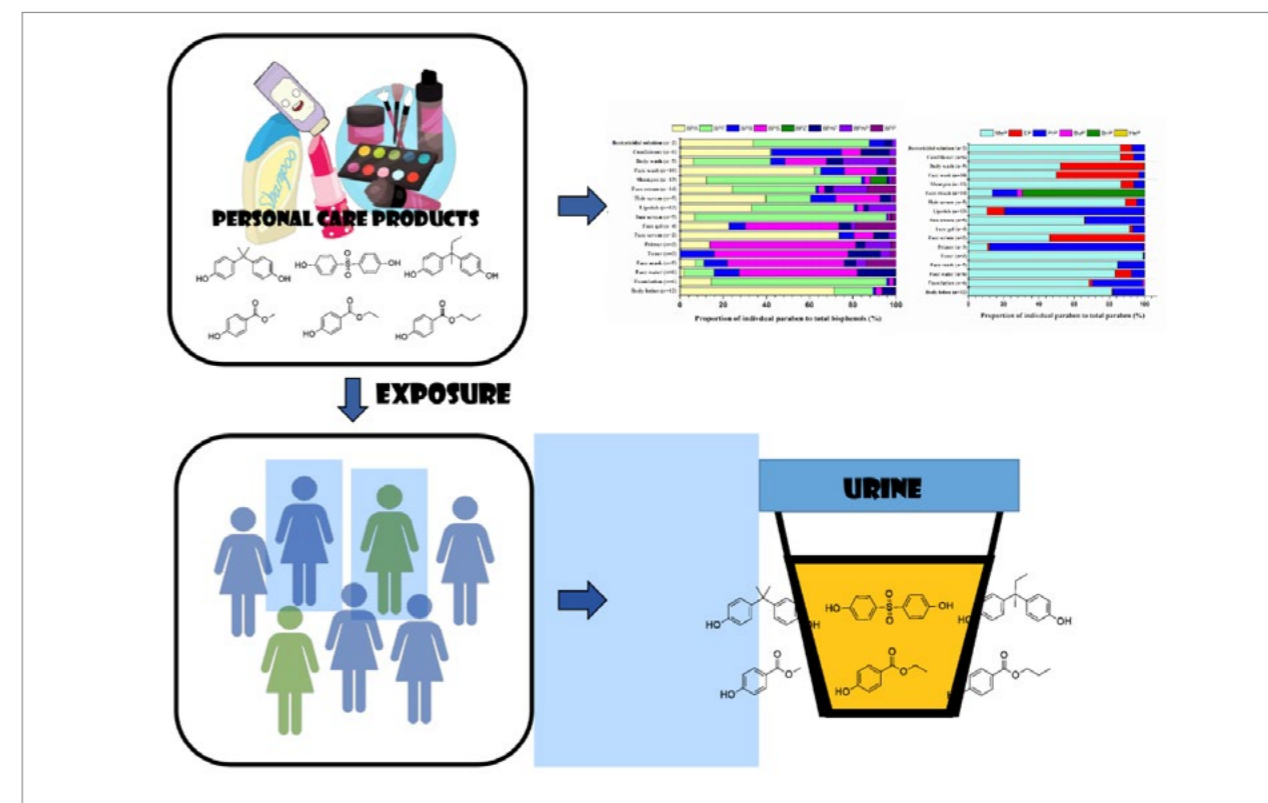


Figure 1. Composition profiles of parabens and bisphenols in various brands of tea bag (inside cover and tea powder) (A) Inside cover samples (B) Tea powder samples

Research Area 4

Estimation of Parabens and bisphenols in personal care products and urinary concentrations in Indian young adults: Implications for human exposure

Exposure of humans to endocrine-disrupting chemicals such as parabens and bisphenols is a matter of concern due to their widespread occurrence and estrogenic potency. Existing studies have suggested positive correlations between personal care products (PCPs) application and urinary paraben concentrations in females, but little is known about exposure levels of paraben and bisphenols arising from PCPs use in Indian women and the risk associated with it. In this study, six parabens (methyl-, ethyl-, propyl-, butyl-, benzyl-, and heptyl- parabens) and 8 bisphenols (Bisphenol A, B, F, P, S, Z, AP, and AF) were determined by liquid chromatography-tandem mass spectrometry (LC-MS/MS) in PCPs samples (n = 114) obtained from India and in the urine sample of young adult female (n=20). The estimated daily intake was calculated for parabens and bisphenols based on the measured concentrations of parabens and bisphenols in PCPs and urine samples. The mean concentrations of 6 parabens in PCPs were 237702.45 ng/g (MeP), 68822.25 ng/g (EP), 72085.27 ng/g (PrP), 4528.77 ng/g (BuP), 87269.46 ng/g (BnP), 38.28 ng/g (HeP). Whereas, the mean concentration of 8 bisphenols in PCPs were 91.71 ng/g (BPA), 48.46 ng/g (BPS), 148.04 ng/g (BPF), 27.46 ng/g (BPB), 23.22 ng/g (BPAF), 12.75 ng/g (BPAP), 6.51 ng/g (BPP), 2.71 ng/g (BPZ). In urine samples analysed, MeP had the highest mean concentration (GM=58.83 ng/mL) followed by PrP, BuP, EP, HeP and BnP (GM=27.28, 11.09, 0.42, 0.06 and 0.01 ng/mL, respectively). Among bisphenols analyzed in urine, BPA, BPP, and BPF were detected with the highest mean concentrations in Indian young adults female (GM=114.85, 7.7 and 5.71 ng/mL, respectively). Maximum dermal absorption dose for parabens and bisphenols was found in body lotion and sunscreen, respectively. The mean estimated dermal intake and uptake for body lotion were 90.17 ng kg bw day⁻¹ and 901.70 ng kg bw day⁻¹, respectively. A significant positive correlation was observed between urinary parabens (MeP and PrP). Also, a significant association was observed between different levels of the waist to hip ratio and urinary paraben concentrations of PrP and BPF. This is the first study to report the exposure of Indian young adult females to parabens and bisphenols and evidence that PCPs usage attributable to the urinary concentrations of these chemicals in Indian young adult females via dermal exposure.



Funded Research Projects

- Identify the DNA Adduct and Associated Metabolic Alterations in Upper Aerodigestive Tract Cancer with Smokeless Tobacco Chewers in the Northeast Region of India: A Metabolomics Approach (Dec 2020-Dec 2023) Funding Body: DST-SERB, Sanction Amount: Rs. 3736240.00, Roshan M Borkar (Principal Investigator)
- Establishment of GMP accredited Pilot Scale extraction facilities for development of phytopharmaceutical products from the Medicinal Plants of NE India Funding Body: DBT, Sanction Amount: Rs. 66350148, Status: On-going, Roshan M Borkar (Co-Principal Investigator)

Research Group

PhD students



Ms. J. Aishwarya
PA/2018-1/001/Ph.D.



Daya Raju Adey
PA/2019-2/003/Ph.D.



Dr. Pawan Kumar Porwal

M.Pharm., Ph.D
Assistant Professor

Research Areas

Profiling stability of Pharmaceuticals and biopharmaceutical and pattern recognition using multivariate approaches

The global market of biopharmaceuticals is continued to escalate, and rapid growth has been observed in last decade. The analytical strategies for determination of protein therapeutics are challenging and having different tactics as compare to chemical agents. Therefore, the photo-induced oxidative stability of small antibiotic peptide i.e. Bacitracin was accessed. Confirmational changes in the spatial arrangement was observed using FT-IR and results of degradation was confirmed using Liquid chromatography. The receptor binding of biopharmaceuticals is depending on its spatial arrangement which is largely influenced by several environmental factors. Characterisation of process related, and host related impurities in protein and peptide therapeutics may leads post-translational modification in chemical structure of protein and peptides, Conversely, the design and executions require thorough planning to study different bio-transformation alternatives i.e. deamidation, oxidation, racemisation, isomerisation, proteolysis and aggregation, etc. The selected method variables were optimized for prediction based multivariate analysis and pattern recognition had helped to analyse pattern of degradation marketed sample. Further, these bio-transformation alternatives/degrades may leads to shorter lifetime, undesirable side effect lead immunogenic toxicity of protein and peptide therapeutics. However, some post translational modifications such as PEGylation, site specific mutagenesis, exon shuffling and humanisation of monoclonal antibodies may extend half-life, shield or eliminate protein epitopes. However available technologies to study are either less reproducible or more costly and more accurate alternatives are highly required

Research Group

PhD students



Ms. Dimple S. Lalchandani
PA/2020-3/004/Ph.D.



Dr. Pramod Kumar

M. Pharm., Ph.D
Assistant Professor

Research Areas

Nanotechnology based product development, pharmacokinetic, biodistribution and pharmacodynamic studies along with reference material development

Dr. Pramod Kumar's laboratory has been working on bioanalytical method development, solid lipid nanoparticles, impurity profiling along with forced degradation studies using Analytical Quality by design. This lab is actively involved short-term/accelerated, mid-term and long-term stability testing of formulations. Our research group is also working on Extraction, screening, identification and characterization of bioactive fractions from the selected plant spices of the north east region using various advanced analytical tools like HRMS, NMR, FT-IR and HPLC. Dr. Kumar is also working on nanomedicine and pharmacokinetic profiling of new chemical entities. Recently, our group has started working of the reference material development and one of the breakthrough reference material (Para-hydroxy prenylamine) has been developed by our group. This reference material has been distributed to all WADA accredited laboratories for the routine quality control purposes. Developed reference material will strengthen antidoping testing programme across the globe. Our research group is also focussing on the method development and validation for the nitrosamine impurities using LC-MS/MS.

Quantification and separation

Regulatory Update

Nitrosamine Impurity	U.S. FDA Acceptable Intake limit (PPM)
NDMA	0.3
NDEA	0.083
NMBA	0.3

Source: Regulatory updates and analytical methodologies for nitrosamine impurities detection in sartans, ranitidine, nizatidine, and metformin along with sample preparation techniques. *Critical Reviews in Analytical Chemistry*. 2020 Jul 20:1-9.

Research Group

PhD students



Sachin Datram Pawar

PA/2020-3/006/Ph.D



Department of Pharmacy Practice

The Department of Pharmacy Practice is one among the first two departments of NIPER Guwahati started functioning from the month of September 2008. Since its inception, the Department of Pharmacy Practice is actively involved in patient care management by collaborating with other healthcare professionals in both Govt. and Private Hospitals in and around Guwahati. The Department of Pharmacy Practice also plays an active role in uplifting the health and wellness of North-East population by conducting health screening and awareness programs.

Further to this, the Department of Pharmacy Practice is identified as a "Centre of Excellence" by Ministry of Tribal Affairs, Govt. of India; and "ADR Monitoring Centre under Pharmacovigilance Programme of India (PvPI)" by Indian Pharmacopoeia Commission, Ministry of Health and Family Welfare, Govt. of India.

Mission:

To provide clinical education that uses evidence-based approaches to optimize the practice of pharmacy, deliver quality patient care, and provide related services.

Faculty Members:

The faculty provide professional educational opportunities for students to enable them to practice pharmaceutical care, adapt to changing professional roles, utilize new technologies, assume leadership roles in a dynamic health-care environment and contribute new knowledge to the profession.

Faculty



Dr. USN Murty

PhD, FRES (London)
Director & Head of the Department

Research Interests: Public Health, Epidemiology.

Email: director@niperguwahati.ac.in



Dr. Ramu Adela

M.Pharm, Ph.D.
Assistant Professor

Research Interests: To find the biomarkers to predict and detect the progression of cardiovascular and diabetes complications by doing basic, preclinical, and clinical research.

Email: ramu.adela@niperguwahati.ac.in



Dr. Krishna Undela

M.Pharm, Ph.D.
Assistant Professor

Research Interests: Medication safety in special population, medication therapy management in cardiology and Oncology, and evidence synthesis.

Email: krishna.undela@niperguwahati.ac.in

Thrust Areas of Research:

- Clinical and Translational Research
- Biomarkers Discovery
- Pharmacogenomics
- Clinical Studies to Diseases Management Programs
- Medication Utilization Evaluation
- Medication Safety Evaluation
- Tribal Population Health Outcomes Evaluation
- Health Economics and Outcomes Research
- Evidence Synthesis

Activities:

- Drug and Poison Information
- Medication Therapy Management
- Evidence Based Medicine
- Personalised Medicine
- Pharmacist Interventions
- Patient Counselling
- Adverse Drug Reaction Monitoring
- Good Pharmacy Practice Awareness
- Community and Social Welfare Programs

Practice and Research Sites:



Gauhati Medical College & Hospital



GNRC North Guwahati Hospital



Dr. B. Borooh Cancer Institute



Down Town Hospital

DEPARTMENT RESEARCH HIGHLIGHTS



Dr. Ramu Adela

Assistant Professor

Research Area:

Platelet mediated inflammation in coronary artery disease in type 2 diabetes patients

Coronary artery disease (CAD) is highly prevalent in patients with type 2 diabetes (T2DM). Platelet hyperactivity associated with type 2 diabetes and it is identified as the main mechanisms behind arterial thrombosis and the development of cardiovascular disease. As Inflammation and thrombosis is intimately linked to platelets and innate immune cells. However, it is not fully understood that how activated platelets triggers inflammatory responses in the CAD patients with T2DM. Hence, we tried to identify platelet activation status, innate immune phenotyping, platelet interaction with the immune cells and activated platelets mediated inflammatory responses in T2DM, CAD and T2DM_CAD patients. In our study, healthy controls (n=20), T2DM (n=40), CAD (n=20) and T2DM_CAD (n=38) were included. Immunophenotyping of innate immune cells, platelet activation, platelet aggregate formation with innate immune cells was also measured by flowcytometry. Further circulatory level of inflammatory markers assessed by multiplex assay. Influence of hyperglycemia on monocyte-platelet aggregate formation was confirmed by an Ex-vivo assay by flowcytometer and confocal microscopy techniques. Significant difference in monocyte subpopulations and dendritic cell populations between the study groups whereas no significant differences in T cell and natural killer populations. T2DM and T2DM_CAD groups showed significant elevation in platelet activation markers and platelet immune cell aggregate formation as compared to control and CAD population and it was positively correlated with FBS and HbA1c. In Ex-vivo, hyperglycaemia treated monocytes and platelets shows concentration and time dependent increase in monocyte-platelet aggregation. Platelet activation and immune cell interaction was significantly correlated with circulatory levels of cytokines and chemokines. Hyperglycemia associated metabolic disturbance alters monocyte and dendritic cells population in T2DM with CAD. Further it is confirmed that hyperglycemia induces platelet activation and form platelet-immune cells interaction leads to release of inflammatory cytokines and chemokines.

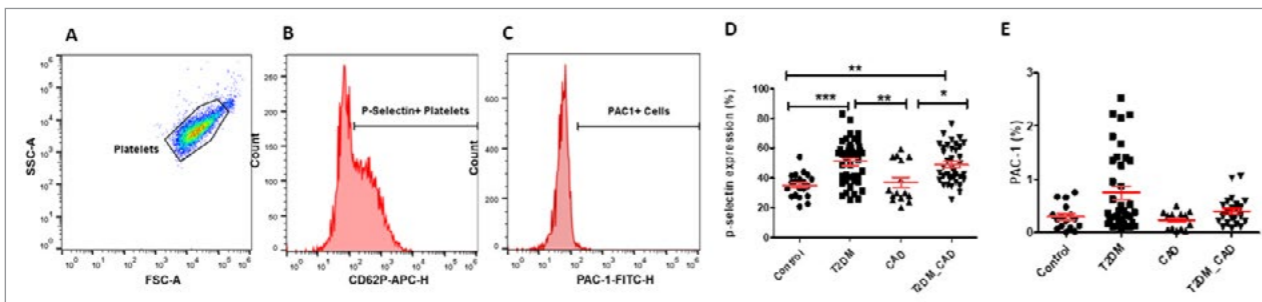


Figure 1: Measurement of platelets activation. (A) Identification of platelets according to their forward scatter and side scatter characteristic from platelet rich plasma. (B) CD62P (P-selectin) positive and (C) Pac-1 positive platelets were assessed from the platelet population. Comparison of percentage of (D) P-selectin positive platelets and (E) PAC-1 positive platelets in disease group also shown. One-way ANOVA used for comparisons between the study groups and $p < 0.05$ was considered significant. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

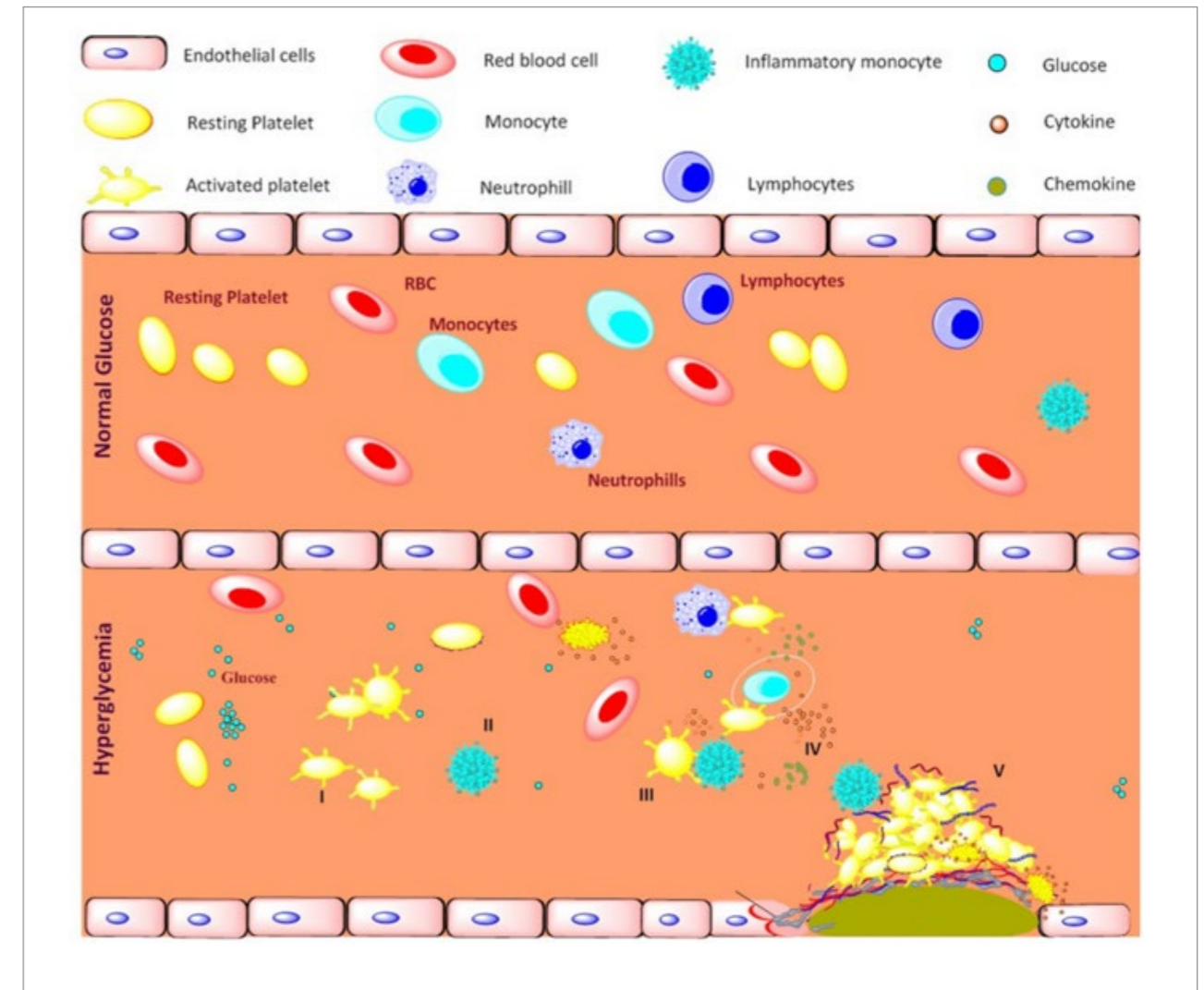


Figure 2: Schematic representation of platelet mediated inflammation process in type 2 diabetes and coronary artery diseases associated with type 2 diabetes.

Funded Research Projects:

Principal investigator: Dr.Ramu Adela, Deep learning assessment for identification of novel diagnostic and prognostic biomarkers for prediction of diabetic retinopathy in northeast population, Funded by Indian Council of Medical Research (ICMR), with an amount 45,00,000/-



Dr. Krishna Undela

Assistant Professor

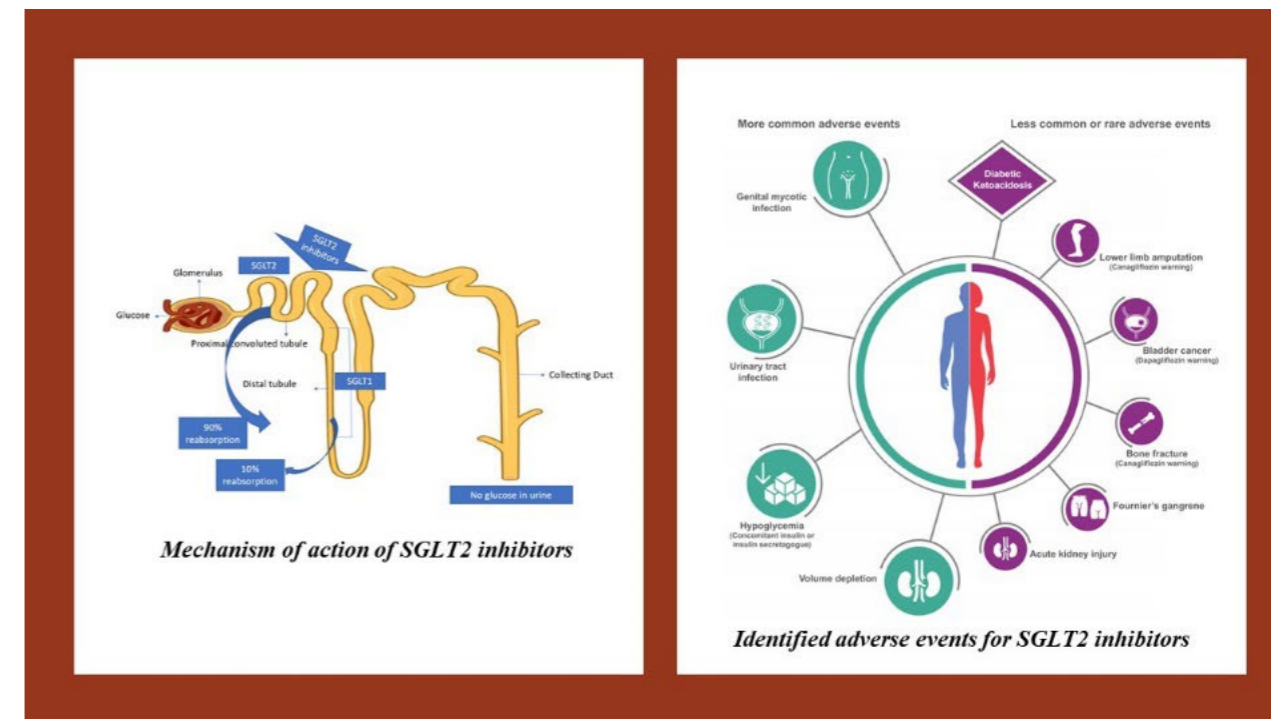
Research Area 1: Pharmacovigilance

Identification of new safety signals of SGLT2 inhibitors: an analysis of USFDA and global safety databases

A retrospective pharmacovigilance analysis was performed in selected spontaneous reporting databases (FAERS, VigiBase and national database of Canada) to identify the new safety signals of SGLT2 inhibitors, which have not been identified to date through pre- and post-marketing surveillance. These databases were used to generate an overall listing of adverse events reported with the use of SGLT2 inhibitors such as Canagliflozin, Dapagliflozin, Empagliflozin from the date of approval by FDA (29th March 2013, Canagliflozin) to 31st March 2021. Disproportionality analyses were performed by calculating the proportional reporting ratio (PRR) with an associated chi-square value, lower bound of the 95% two-sided confidence interval of reporting odds ratio (LL ROR), and lower bound of the 95% two-sided confidence interval of the information component (IC025). Leaving the safety signals already identified for the SGLT2 inhibitors by FDA (diabetic ketoacidosis, toe amputation, osteomyelitis, acute kidney injury, urinary tract infection, fungal infection, fournier's gangrene), the new signals identified by analyzing the FAERS database were Cellulitis (Canagliflozin: NComb=1022, PRR=24.7; Dapagliflozin: NComb=36, PRR=3.0; Empagliflozin: NComb=72, PRR=2.5), Skin Ulcer (Canagliflozin: NComb=588, PRR=27.2; Dapagliflozin: NComb=15, PRR=2.4; Empagliflozin: NComb=60, PRR=4.0), Pancreatitis (Canagliflozin: NComb=381, PRR=7.5; Dapagliflozin: NComb=91, PRR=6.4; Empagliflozin: NComb=255, PRR=7.4), Cerebral Infarction (Canagliflozin: NComb=87, PRR=3.9; Dapagliflozin: NComb=126, PRR=20.2; Empagliflozin: NComb=77, PRR=5.1). The event Nephrolithiasis also shows an association with Canagliflozin (NComb=111, PRR=3.4). The analysis of global data through VigiBase and Canadian data reiterated the findings of FAERS. This up-to-date pharmacovigilance analysis identified that the SGLT2 inhibitors are associated with serious adverse events that had not been previously identified, including cellulitis, skin ulcer, pancreatitis, and cerebral infarction. The clinical studies should be carried out to validate the identified signals.

Drugs banned in other countries but still available in India: facts and figures

A study was conducted to identify the drugs which are banned outside but still available in India and to assess the safety profile of these medications in India by comparing with other countries. Data available at the regulatory agency websites like US FDA, EMA, TGA, and CDSCO as well as articles published with information on drugs banned in various countries were searched in PubMed and Google Scholar to identify the drugs which are banned in their respective countries and at the same time reason for their availability in India. The study includes only those drugs which are withdrawn for safety reasons between 1961 and 2020. We identified 53 drugs in total that are banned in the US, EU, Australia, and Canada which are still marketed in India. In most of the cases, cardiovascular events such as Valvulopathy and Cardiac arrhythmia are found to be the reason for banning drugs in their respective countries. Four drugs, Dinoprostone withdrew in the UK in 1990, Clozapine withdrew in EU in 1975, Bicalutamide withdrew in the UK in 2003, Nifedipine withdrew in Australia in 1996 were found to be listed under the NLEM-2015 of India. The reason behind availability of these banned medications in India is not-enough safety information generated from India on these medications. Hence, it is important that all the healthcare professionals including physicians, nurses, pharmacists, and patients need to report ADRs to the regulatory authorities to take an appropriate action to ensure that drugs which are banned outside not misused or sold in India.



Research Area 2: Evidence Synthesis

Efficacy and safety of isoniazid preventive therapy for tuberculosis in people living with HIV: a systematic review and meta-analysis

We have systematically assessed the efficacy (in terms of incidence of TB and all-cause mortality) and safety (in terms of hepatic and other adverse events) of isoniazid preventive therapy (IPT) in people living with HIV (PLHIV) by conducting a systematic review and meta-analysis. A thorough literature search was performed in PubMed, Cochrane CENTRAL, and Google Scholar from the inception to 31st December 2020. A combination of keywords, MeSH terms, and entry terms on tuberculosis, HIV and, IPT was used in combination with Boolean operators. All Randomized Controlled Trials (RCTs) investigating the efficacy and safety of IPT on PLHIV in comparison with placebo or active comparator were included in the study. The Fixed or Random-effects model was used based on the heterogeneity identified by using the I^2 statistic and Cochran's Q test. Out of 985 non-duplicate RCTs identified through database searching and an additional 5 records identified through other sources, a total of 26 studies, with 38005 patients were included in the study. The incidence of TB (OR 0.70; 95% CI 0.56-0.86; $P=0.0009$) and all-cause mortality rate (OR 0.87; 95% CI 0.79-0.97; $P=0.01$) were found to be significantly lower in the IPT group compared to the control group. Further, there is no significant association identified between IPT and safety issues like any adverse events (OR 0.86; 95% CI 0.62-1.18; $P=0.34$), hepatotoxicity (OR 1.21; 95% CI 0.97-1.52; $P=0.09$), peripheral neuropathy (OR 1.50; 95% CI 0.96-2.36; $P=0.08$) and discontinuation of therapy (OR 0.88; 95% CI 0.45-1.73; $P=0.72$). Less population size and a smaller number of outcomes may be the reason for non-significant results in terms of safety issues of IPT, hence there is a need for large and long-term studies to address these issues further.

Quality assessment of research articles published on COVID-19

A study was conducted to evaluate the quality of randomized controlled trials (RCTs) and observational studies (cohort and case-control studies) published on COVID-19 and also to investigate the reasons behind compromising the quality, if found. Literature search was performed in PubMed, Google Scholar and Cochrane CENTRAL to identify the RCTs, Cohort and Case-control studies published on COVID-19 between 1st Dec 2019 to 31st Dec 2020. Research articles met with study criteria were included in the study. Assessment of quality of RCTs was done using modified Jadad scale and that of cohort and case-control studies were done using Newcastle-Ottawa scale. A total of 21,259 records of RCTs were identified through database searching, out of which 61 RCTs were included in the study and, among that 33 (50.0%) were of moderate quality, and 8 (12.1%) were of low-quality studies. Among 8129 identified records of cohort studies, 48 studies

were included in the study, out of which 24 (50.0%) were of high risk of bias, and 2 (4.16%) were of very high risk of bias studies. Out of 7278 identified records of case-control studies, 13 studies were included in the study and among that nine (69.23%) were of high risk of bias studies. Findings from this study indicate that accelerated publication of COVID-19 research along with the fast-track review process has resulted in lowering study quality scores. With the emergence of stronger evidence, COVID-19 clinical studies with lower methodological quality should be revisited.

Awards & Recognitions

The Indian Pharmacopoeia Commission (IPC), Ministry of Health and Family Welfare, Govt. of India has approved NIPER Guwahati as an 'Adverse Drug Reaction (ADR) Monitoring Centre' under the Pharmacovigilance Programme of India.

NATIONAL INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH (NIPER-Guwahati)

Hearty Congratulations..!!

Happy to inform that Indian Pharmacopoeia Commission (IPC), National Coordination Centre (NCC) - Pharmacovigilance Programme of India (PvPI), Ghaziabad has approved **NIPER GUWAHATI** as **ADVERSE DRUG REACTIONS MONITORING CENTRE (AMC)**

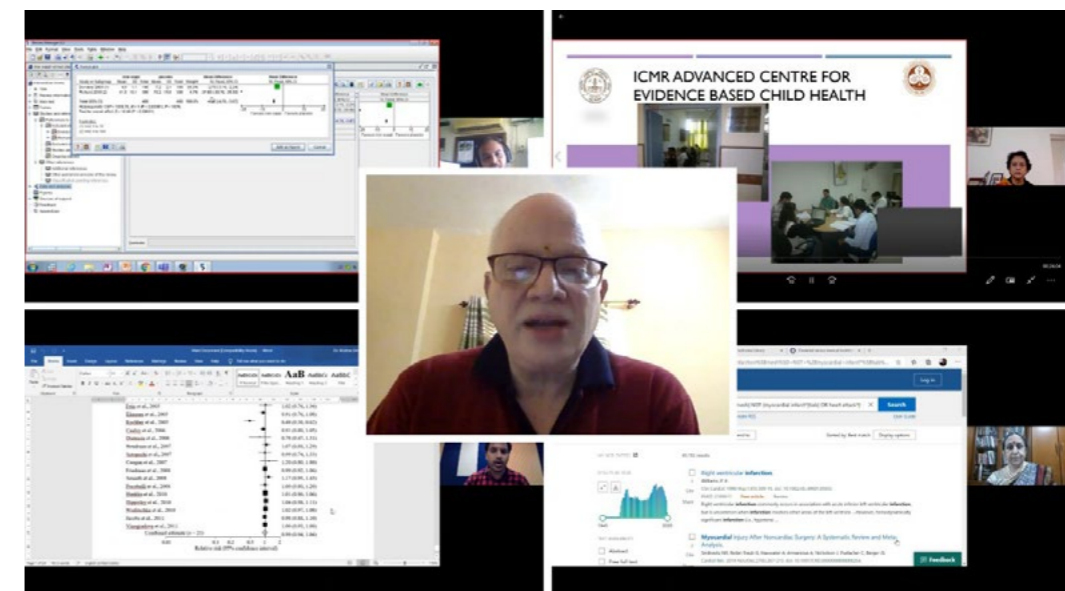
Coordinators

- Dr. Krishna Undela, Asst. Prof. (Dept. of Pharmacy Practice) NIPER-G
- Dr. Ramu Adela, Asst. Prof. (Dept. of Pharmacy Practice) NIPER-G
- Prof. USN Murty, Director NIPER-G

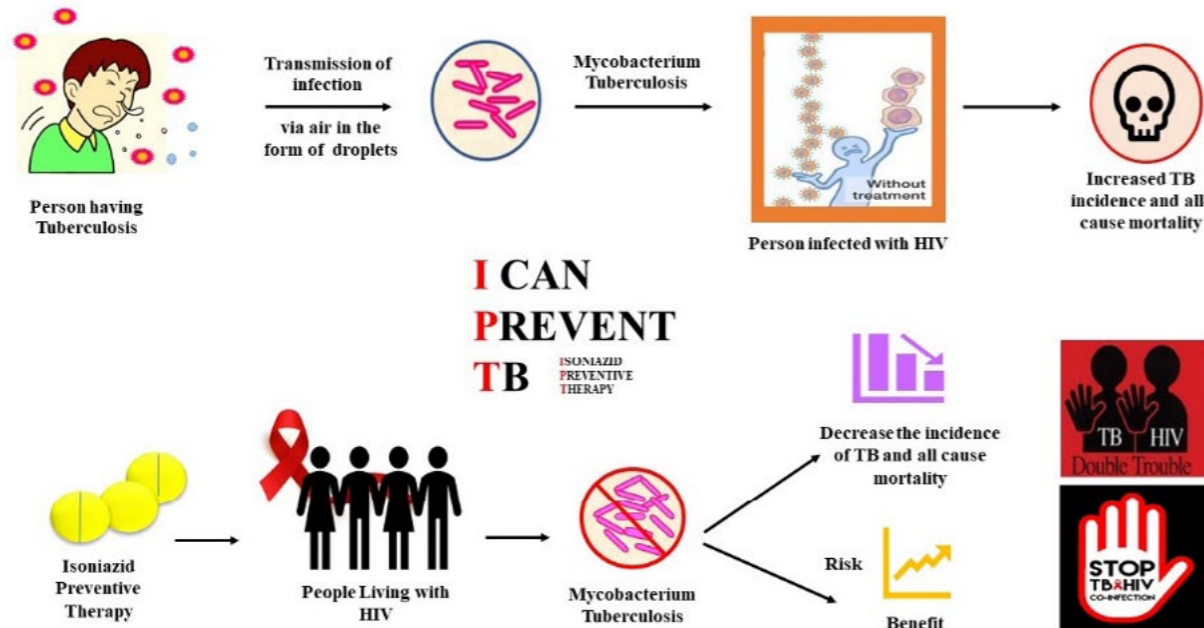
Conferences/Workshops/Training Programs Organized

Workshop on Systematic Review and Meta-analysis

The Department of Pharmacy Practice, NIPER Guwahati organized a "National Online Workshop on Generating the Highest Level of Evidence through Systematic Review and Meta-analysis: Best Alternative for Hospital Based Projects during the Current Pandemic Situation" on 28th & 29th August 2020. More than 2000 participants from all over India registered, attended and benefitted from this workshop.

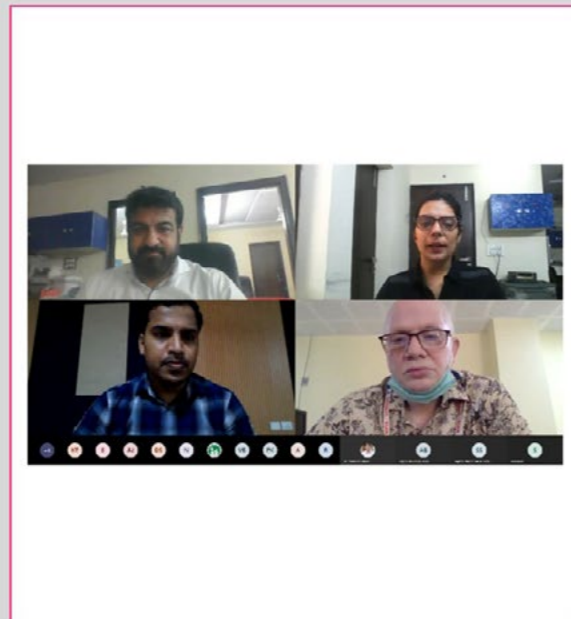
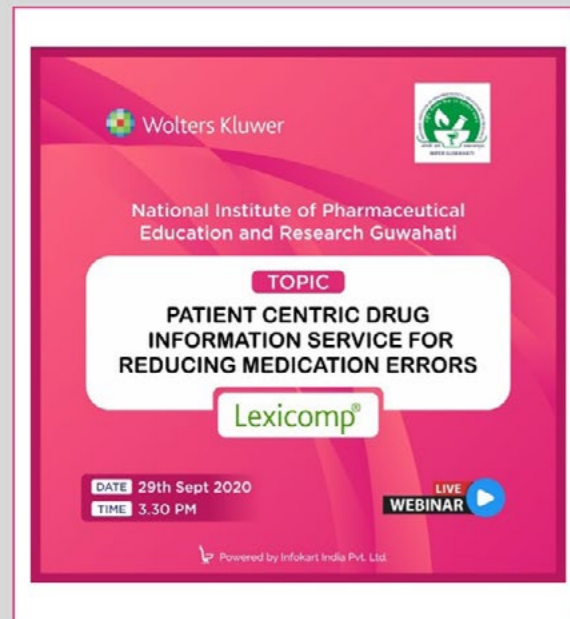


Efficacy and Safety of Isoniazid Preventive Therapy for Tuberculosis in People Living With HIV: A Systematic Review and Meta-Analysis



Webinar on Lexicomp

The Department of Pharmacy Practice, NIPER Guwahati in association with Wolters Kluwer organized a webinar on 'Patient Centric Drug Information Service for Reducing Medication Errors' on 29th September 2020.



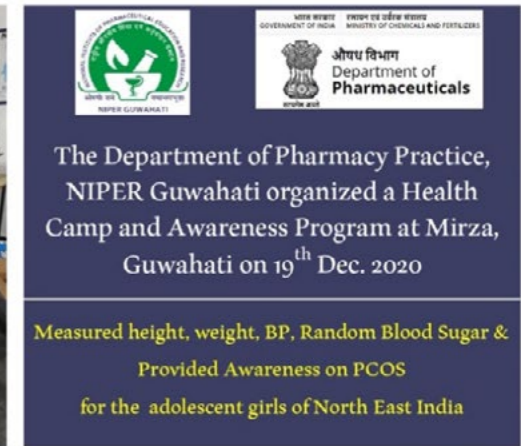
Health Camps/Outreach Programs Organized



NIPER Guwahati Conducted a Health Screening Camp in Tribal Area
@ Nihang Rongkethe (V), Diphu (P.O.), Karbi Anglong (D), Assam
Under Centre of Excellence (CoE), MoTA, Govt. of India
On 08th Nov 2020



National Institute of Pharmaceutical Education and Research (NIPER)-Guwahati
Conducted a Health Screening Camp in Tribal Area
@Pancha Kanya (V), Near Basistha Mandir, Kamrup (D), Assam
Under Centre of Excellence (CoE), MoTA, Govt. of India
On 23rd Dec 2020





National Institute of Pharmaceutical Education and Research (NIPER) Guwahati
Conducted a Health Screening Camp in Tribal Area
@Karaibari (V), Dhupartari (GP), Kamrup (D), Assam
Under Centre of Excellence (CoE), MoTA, Govt. of India
On 9th Feb 2021



National Institute of Pharmaceutical Education and Research (NIPER) Guwahati
Conducted a Health Screening Camp in Tribal Area
@Khalih Mari (V), Goroimari (T), Kamrup (D), Assam
Under Centre of Excellence (CoE), MoTA, Govt. of India
On 11th Feb 2021



Skill Development Programs Organized



Three Days Skill Development Program for Tribal Students in North East Region of India
Supported by
Centre of Excellence (CoE) Scheme
Ministry of Tribal Affairs, Govt. of India
23rd - 25th February 2021
National Institute of Pharmaceutical Education and Research (NIPER), Guwahati
(Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Govt. of India)
Site Katakam (Malguriak), P.O. Changari, Dist. Kamrup, Assam, Pin: 781101, Assam, India

Three Days Skill Development Program for Tribal Students in North East Region of India
Supported by
Centre of Excellence (CoE) Scheme
Ministry of Tribal Affairs, Govt. of India
8th - 10th March 2021
National Institute of Pharmaceutical Education and Research (NIPER), Guwahati
(Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Govt. of India)
Site Katakam (Malguriak), P.O. Changari, Dist. Kamrup, Assam, Pin: 781101, Assam, India

Research Group



G. Surender
Ph.D. Scholar



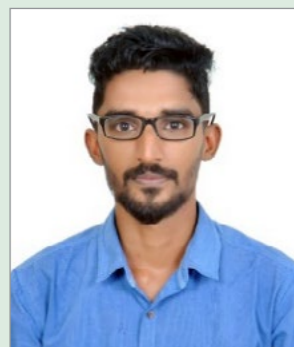
Ebin Johny
Ph.D. Scholar



Bincy Varghese
Ph.D. Scholar



Mounika Nadella
Ph.D. Scholar



Christy Thomas
Ph.D. Scholar



Bishamber Nath
Ph.D. Scholar



Jahnabi Saikia
Project Assistant



Department of Biotechnology

The Department of Biotechnology at the National Institute of Pharmaceutical Education and Research (NIPER), Guwahati started offering M.S. (Pharm) in Biotechnology since 2010 and Ph.D. program since 2014 to contribute to the fascinating and vast area of drug discovery, biological sciences and its applications in Pharmaceutical Sciences. Biotechnology Department of NIPER-Guwahati is dedicated to understand disease pathogenesis, drug mechanisms, target identification and therapeutic intervention in chronic and complex diseases like cancer, diabetes and cardiovascular diseases.

Faculty



Dr. Sanjay K Banerjee

PhD: AIIMS, New Delhi

Associate Professor

Research areas: Cardiometabolic disease



Dr. S Sudhagar

PhD: Anna University, Chennai

Assistant Professor

Research Areas: Cancer Biology



Dr. Purusottam Mahapatra

PhD: KIIT, Bhubaneswar

DBT-Ramalingaswami Fellow

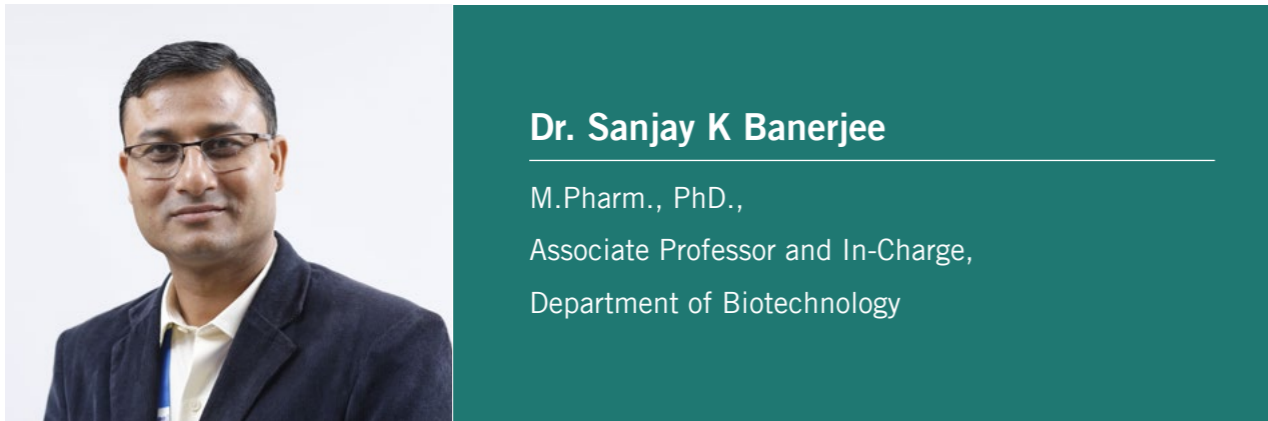
Research Area: Cancer Biology

Major Thrust Area of Research

1. Target based and phenotype-based drug discovery in cancer and cardiometabolic disorder
2. Genetically modified bacteria for therapeutic intervention
3. Identifying novel targets and developing assay system
4. Pharmacogenetics and personalized medicine
5. Disease mechanisms: Inflammation and energy metabolism
6. Developmental defects and cardiac reprogramming
7. Breast Cancer Biology and drug Resistance mechanisms
8. Basic Biology - Stem cell Biology and Signal Transduction
9. Biopharmaceutical Technology – therapeutically Important proteins and peptides
10. Screening small molecules and plant-derived products

Research Themes





Dr. Sanjay K Banerjee

M.Pharm., PhD.,
Associate Professor and In-Charge,
Department of Biotechnology

Research areas: Cardiometabolic disease

Research Area 1

1. Drug discovery in cardiometabolic disease: Understanding disease mechanisms, target identification and therapeutic intervention

Biotechnology Department research focus is to identify novel targets and understand the molecular mechanisms of chronic and complex diseases like cardiac hypertrophy, heart failure, diabetes and non-alcoholic fatty liver disease. The research revealed several novel cellular signaling pathways that perturbed during disease progression and could be useful as target to reverse the disease process. Post-translational modification of non-histone proteins play crucial role to regulate

energy metabolism process in different cells including cardiomyocytes. The group is working to identify how acetylation of proteins regulate certain cellular events like inflammation, ROS generation, energy generation and mitochondrial dynamics. Data showed that activation of SIRT1, a nuclear sirtuins, provides cardioprotection in diabetic heart via deacetylation of nuclear and mitochondrial proteins. We have explored the SIRT1-SIRT3 axis and its activation by small molecules (Figure 1). Further, Biotechnology Department is actively engaged to examine small molecules, plant-based and nutritional products including vitamin D to screen them in different cardio-metabolic disease models.

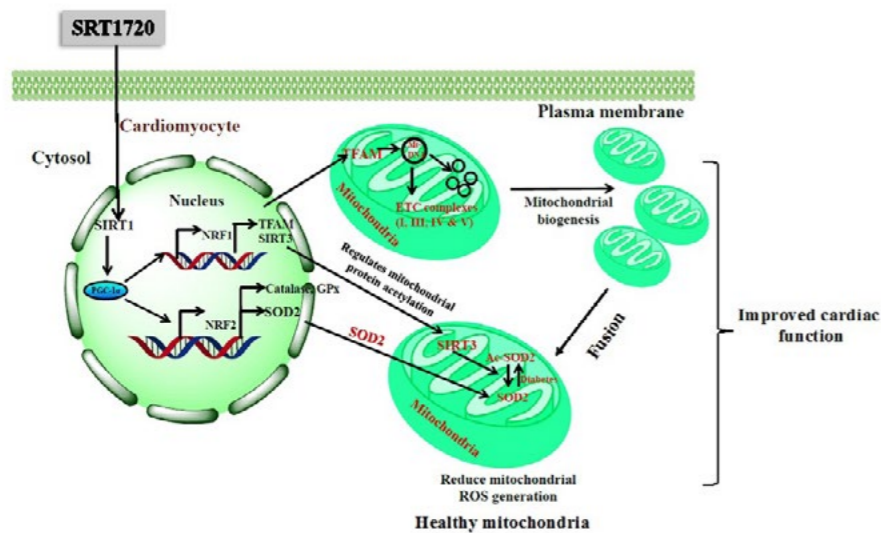


Figure 1: Sirt1 ameliorates cardiac complications in diabetic heart via regulation of mitochondrial Health through Sirt3 activation

2. Molecular defects in neonatal heart: Role of gestational diabetes

Women with pregestational diabetes (PGDM) develop diabetes-induced developmental impairment in their offspring. Among different PGDM-induced developmental defects, cardiac dysfunction in offspring believe to be more detrimental in their later life. The modulation in expression of several transcription factors (TFs) due to hyperglycaemia in different stages of foetal development might be responsible for molecular defects in the heart. To understand the molecular defects in the two-days old neonatal rats, streptozotocin (STZ)-induced diabetic female rats were bred with healthy male rats, and we collected two days old hearts from neonates for this study. Neonatal rats from PGDM mother showed altered electrocardiography and echocardiography parameters. Gene expression data from RNA-seq identified 68 and 271 significantly upregulated and downregulated genes, respectively in pregestational diabetes, with 26 and 51 genes were transcription factors up- and down-regulated. Gene ontology and KEGG annotation revealed that several of the altered genes were related to different pathways related to heart development, myocardial fibrosis, cardiac muscle cell repolarization, cell proliferation, cellular response to reactive oxygen species, histone acetylation, activin, AMPK signaling pathway and vasculature development (Figure 2).

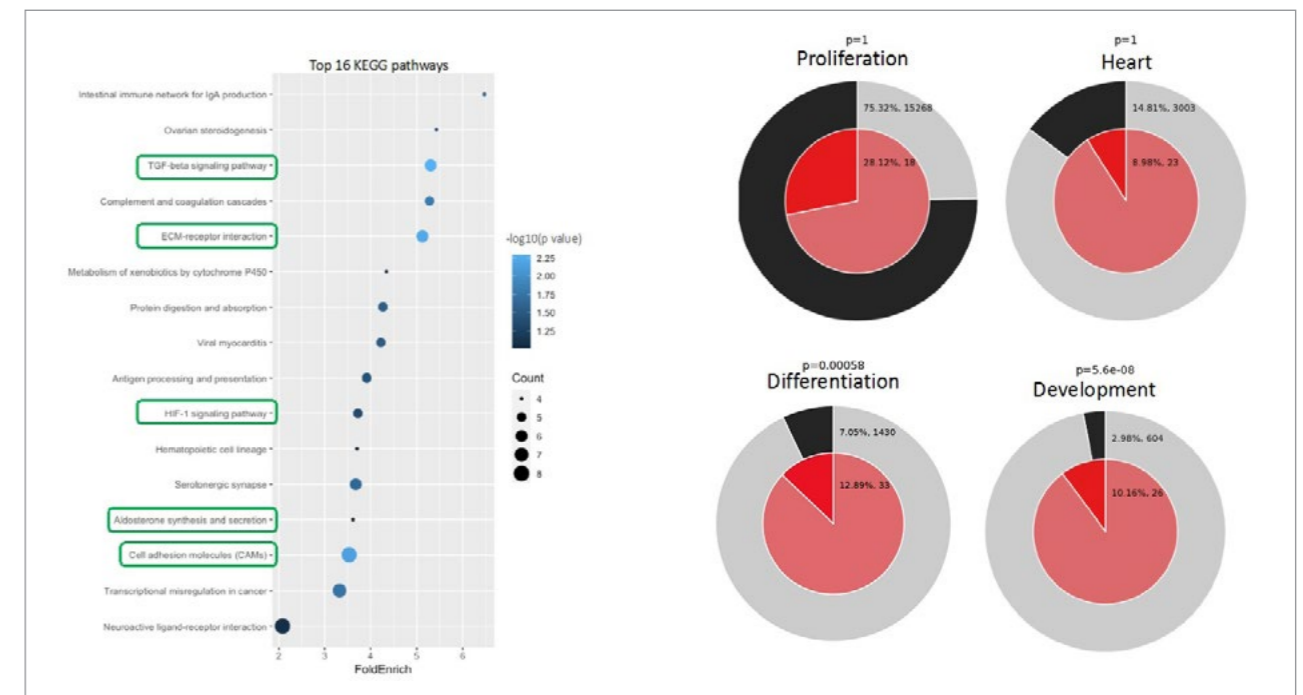


Figure 2: Transcriptomic data reveals signaling pathways that affect the neonatal heart due to pre-gestational diabetes.

3. Role of Allyl methyl sulfide on platelet activation in diabetes

Diabetes mellitus (DM) is one of the chronic and complex metabolic disorders. Uncontrolled blood glucose levels over time may cause several cardiovascular complications including enhanced platelet activation and their aggregation. The central mechanism of cardiovascular complications in diabetes includes imbalance in the homeostasis of blood coagulation and fibrinolysis. This imbalance in diabetes results in diabetic thrombocytopeny, a condition majorly effects platelet function and ultimately results in heart attacks and stroke in diabetes. Evidence showed that antiplatelet therapy can reduce the cardiovascular complications in diabetes and the premature death. Reducing platelet aggregation in diabetes has become challenging. We have explored the effect of Allyl methyl sulfide (AMS), an active metabolite of garlic, on platelet activation in diabetic condition. Our study showed that AMS reduced platelet activation as observed by CD62P marker in diabetic rats (Figure 3). The effect of AMS is comparable with standard anti-platelet drug Aspirin.

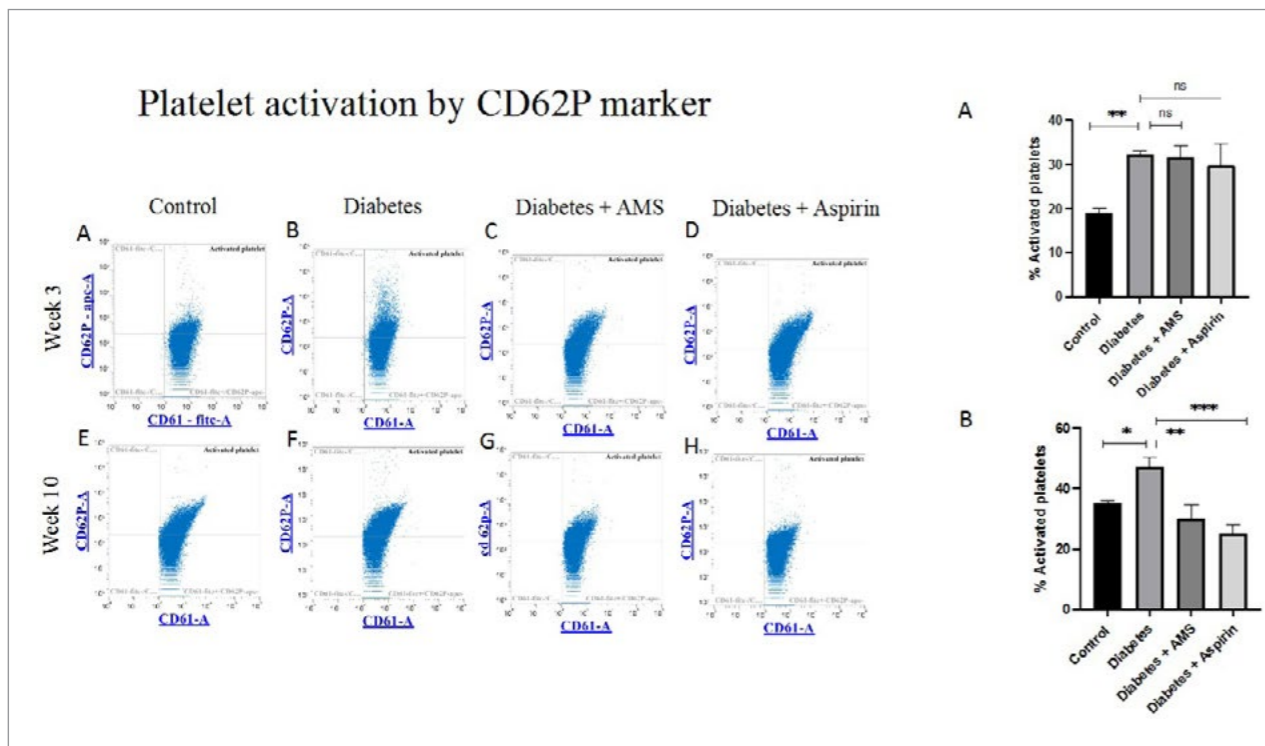


Figure 3: Flow cytometry analysis of platelet activation showing % dual positive cells (CD61+, CD62P+).



Research Group

Research Associate and PhD Scholar



Dr. Md. Jahangir Alam
ICMR-Research Associate



Mr. U Shravan Kumar
Ph.D. Scholar



Ms. Poonam Kumari
Ph.D. Scholar



Mr. Vikas Tiwari
Ph.D. Scholar

MS Students



Ms. Malladi Navya



Puppala Vaishnavi



Ms. Suchita Shalini



Ms. Vaidehi



Dr. S.Sudhagar, MSc, MPhil, PhD

Assistant Professor
Department of Biotechnology

Research Areas :

- Understanding tamoxifen resistance under different tumour microenvironment
- Understanding cancer cells metabolic adaptations and its therapeutic implications

Cancer Biology and Metabolic adaptations

Targeting estrogen receptor remains the primary choice of treatment against breast cancer as nearly, one-third of newly diagnosed breast cancers are estrogen receptor alpha positive. ER α modulators, such as tamoxifen, have been well proven for improved survival rate of women with early and advanced breast cancers. The primary challenge in the long-term efficacy of this therapy is the development of acquired resistance in most of the cases. Breast cancer cells frequently experience low oxygen condition, termed as hypoxia, and nutrition deprived condition, a major biochemical feature in their tumor microenvironment and often correlates with poor response to hormonal and chemotherapy.

Emerging reports suggest that targeting the tumor microenvironment could be an important strategy to overcome drug resistance and improve the therapeutic efficacy. Biotechnology department is focusing on to understand the molecular cross talk that links mitochondrial dynamics to acquired tamoxifen resistance under biochemical tumor microenvironments, such as low nutrition and hypoxia. Identification of novel targets and development of anti-cancer therapies which could overcome acquired resistance and improving the quality of life.

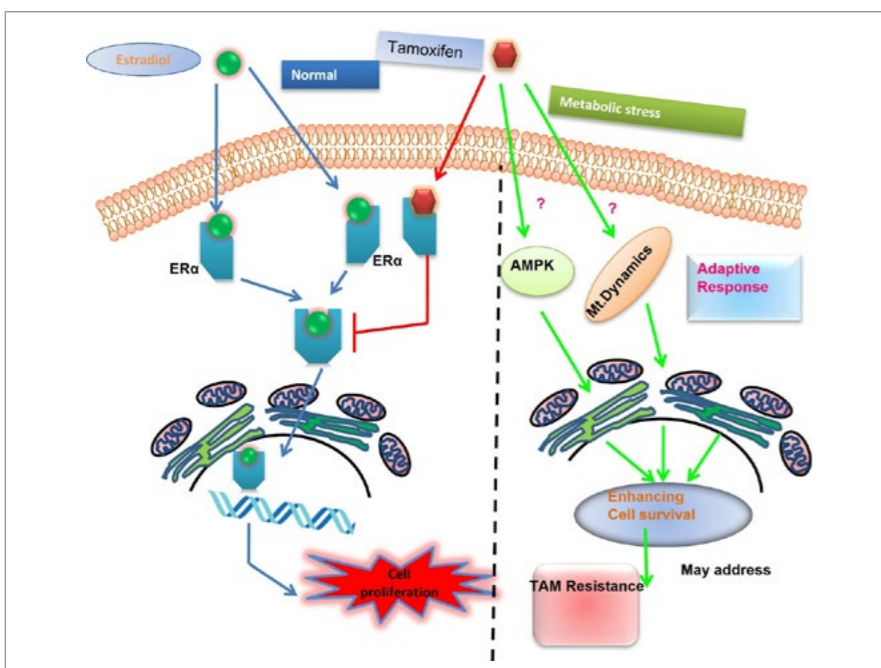


Figure 1: Signaling pathway that causes Tamoxifen resistant in cancer cells.

Research Group

PhD Students



Mr. Gangipangi Vijayakumar

Ph.D. Scholar



Ms. Thool Madhuri Kawadu

Ph.D Scholar



Ms. Bidisha Biswas

Ph.D. Scholar

Post-graduate Students



U Sai Swetha

MS (Pharm)



Prakash Y K

MS (Pharm)



Nandhini

MS (Pharm)



Bhanu Reka

MS (Pharm)



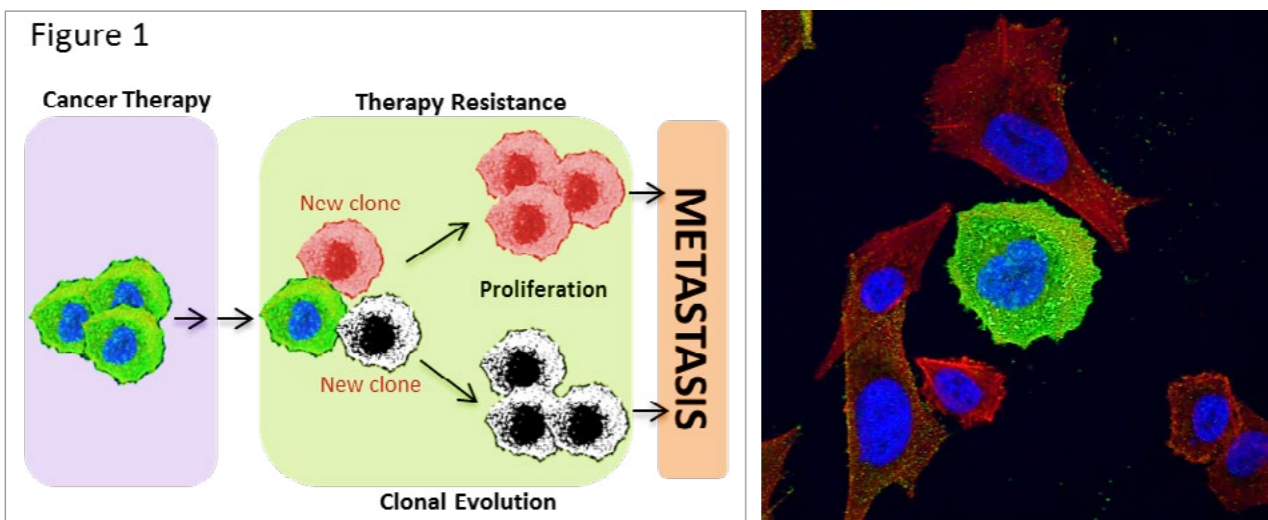
Dr. Purusottam Mohapatra, Ph.D.

DBT Ramalingaswami Fellow, Govt. of India
Department of Biotechnology

Research Areas : Clonal Evolution in Drug Resistance cancers

1. Studying the Key Cellular Signalling Associated with Clonal Evolution of Drug Resistant Cancers

Clonal evolutions have been evidenced before in the processes of development of drug resistance in different cancers. For instance, resistance to BRAF-inhibitor in BRAF-mutant melanoma results in the evolution of clones with hyperactivated RAS-ERK signalling pathway which leads to aggressive cancer in patients. We are studying the key molecular regulators of clonal evolution by using various cancer cell line models and patient derived tissue samples. We are employing advanced cutting-edge technologies i.e., CRISPR, Quantitative Imaging etc. in our studies.

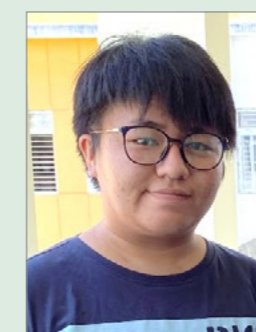


Figures: (Left) An overview of therapy mediated clonal evolution and increased invasion in drug resistant cancers (Right) resistant cancer cell with unique protein expression.

2. Development of Anti-Metastatic Therapeutic Peptides and Combinations Against India-Centric Metastatic Cancers of Women

Metastasis is a complex process that often leads to poor prognosis in patients having metastatic cancers. The cellular signalling associated with metastatic steps of cancers is not fully understood. Metastatic ovarian cancer is the second most frequent cancer type after breast cancer in Indian women that claims many lives each year. The metastatic signalling in ovarian and breast cancer are not studied properly in Indian patient samples and probably, therefore, there are no anti-metastatic therapeutic molecules available to obstruct ovarian cancer metastasis. We have identified a couple of key molecular regulators of ovarian and breast cancer cell adhesion and invasion, the crucial steps in the processes of metastasis. Currently, we are working towards the development of novel peptides and combination therapies to obstruct the metastasis in these cancer models.

Post-graduate Student



Ms. Sandra Lalchhunanawmi





Department of Medicinal Chemistry

The Department of Medicinal Chemistry at the National Institute of Pharmaceutical Education and Research - Guwahati (NIPER-G) was established in the year of 2020. It is a multidimensional discipline, and the activity of this division is focused on improving human well-being through research that leads to the design and development of safe and effective therapeutic agents. Identification of druggable targets, target validation, rational drug design, structural biology, computer-aided drug design, HIT to LEAD development (HIT identification, validation, and optimization), method development (chemical, biochemical, and computational), modelling reaction mechanism, extraction, and isolation of bioactive natural product compounds, molecular characteristics of drug action, establishing the relationship of chemical structure to the drug action and effects of metabolism on the drug structure, etc. are in the scope of this Department. In short, we focus on Drug Design, Synthetic Chemistry, and Natural Product Chemistry with the broad goals of drug discovery and optimization. The research programs of the Department are broad which include but not limited to Molecular Modelling, Synthetic Medicinal Chemistry, Biochemistry & Peptide Chemistry, and Natural Products Chemistry. Active research collaborations and joint post-graduate courses eliminate barriers and create a flourishing scientific environment at the NIPER-G. M.S. (Pharm.) and Doctorate (Ph.D.) programs in the Department of Medicinal Chemistry are devoted to high-quality research, education, and training of students. Our emphasis is to make students creative and independent investigators for their future positions in the academic or industrial environment. The department will continue to leverage its core strengths in emerging as one of the leading centers of excellence in Medicinal Chemistry in the country.



Research Laboratory of Department of Medicinal Chemistry

Faculty



Dr. Hemant Kumar Srivastava

M. Sc., Ph.D.

Associate Professor

Research Areas:

Molecular modelling using advanced computational techniques: Molecular dynamics (MD) simulations and QM/MM calculations.

Data analytics and SAR: Big Data, Artificial intelligence (AI) (Machine and deep learning (ML and DL), QSAR, Database creation, etc.

Reaction profiles: Quantum mechanical (QM) including density functional theory (DFT) calculations to solve reaction mechanisms for chemical reactions. QM/MM calculations for biological reactions involving proteins, etc.



Dr. Kalyan Kumar Sethi

M. Pharm, Ph.D.

Assistant Professor

Research Areas:

Drug Design, Discovery, and Development

Natural product chemistry (Extraction, isolation, purification, and characterization of Active Pharmaceutical Ingredients from natural resources), Organic synthetic chemistry related to drug discovery, and Pharmaceutical Chemistry. Human Carbonic Anhydrases Inhibitors, Hypoxia Induced Cancer

Analytical and Bio-analytical studies of Pharmaceutical and Nutraceutical compounds.

Thrust area of Research

- Drug Discovery
- Synthetic Medicinal Chemistry
- Molecular Modelling (Drug Design)
- Natural Product Chemistry

Departmental Activities

- Drug Discovery
- Organic Synthetic Medicinal Chemistry
- Molecular Modelling (identification of druggable targets, target validation, structural biology, CADD, HIT to LEAD development)
- Active research collaborations (IIT, NDTL, etc.)
- Hands-on Training and workshops (MMTT-2021, CADD-2021, etc.)
- Research Publications in reputed International Journals (JBSD, Chem. Com., Organometallics, Pharmaceuticals, etc.)

Research Highlights

The research focus of the Medicinal Chemistry department spans on to multidimensional research areas in the identification of druggable targets, target validation, rational drug design, structural biology, computer-aided drug design, HIT to LEAD development, synthetic and natural product chemistry, etc.

Followings are some of the research highlights from the department:

Seven hundred compounds from ZINC/CHEMBL databases, fourteen hundred compounds from drug-bank, and 300 FDA approved drugs were selected subjected to standard-precision (SP) and extra-precision (XP) mode of docking. Generated docked poses were carefully visualized for known interactions within the binding site. Molecular mechanics-generalized born surface area (MM-GBSA) calculations were performed to screen the best compounds based on docking scores and binding energy values. Molecular dynamics (MD) simulations were carried out on four selected compounds (HITs) from the ChEMBL database to validate the stability and interactions. MD simulations were also performed on the PDB structure 6YF2F to understand the differences between screened molecules and co-crystallized ligand.

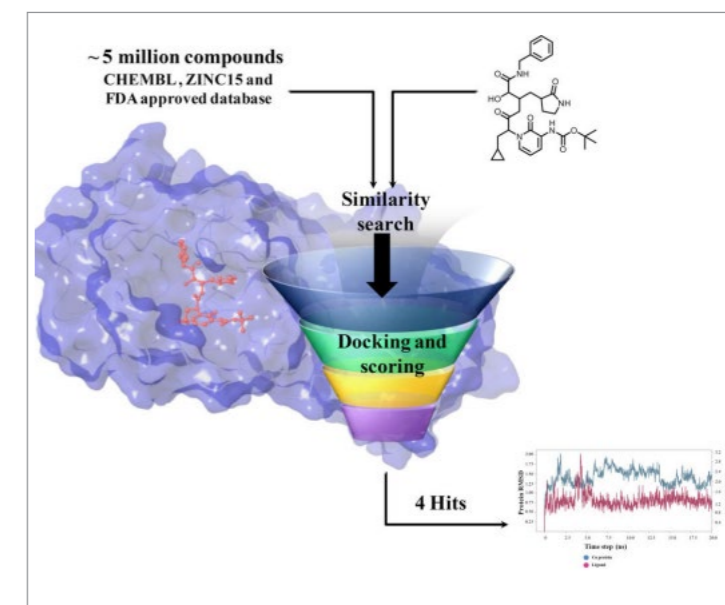


Figure 1: 5 Million compounds from ChEMBL, ZINC15 database and FDA approved drugs were screened and Molecular dynamics simulations were performed



A modular approach for the construction of β - and γ -lactam fused dihydropyrazinones from the readily available Ugi adducts has been described. The sequential construction of rings through base-mediated cycloisomerization followed by acid-mediated cyclization yielded β -lactam fused dihydropyrazinones. However, the Ugi-derived dihydropyrazinones afforded γ -lactam fused dihydropyrazinones under base-mediated cycloisomerization (Figure 2). Substrate scope, limitations and mechanistic investigations through DFT-calculations have been explored.

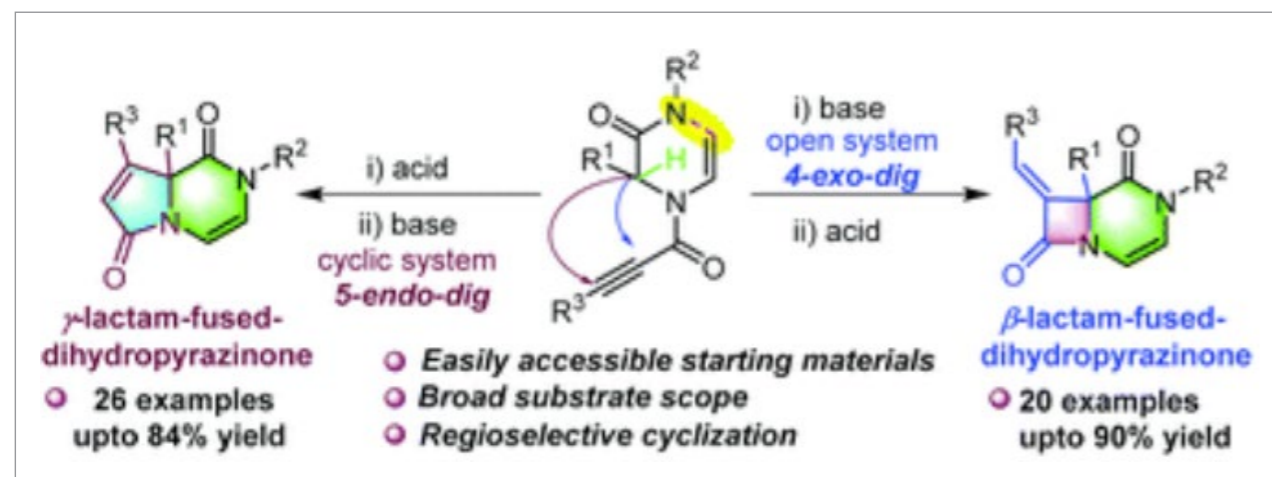


Figure 2: Synthesis of β - and γ -lactam fused dihydropyrazinones from the readily available Ugi adducts.

The conversion of glycerol selectively to lactic acid has been accomplished in high yields (ca. 90%) by using a NNN pincer-Ru catalyst (Figure 3). DFT explains the role of the Ru-P bond and sterics in favoring the catalysis.

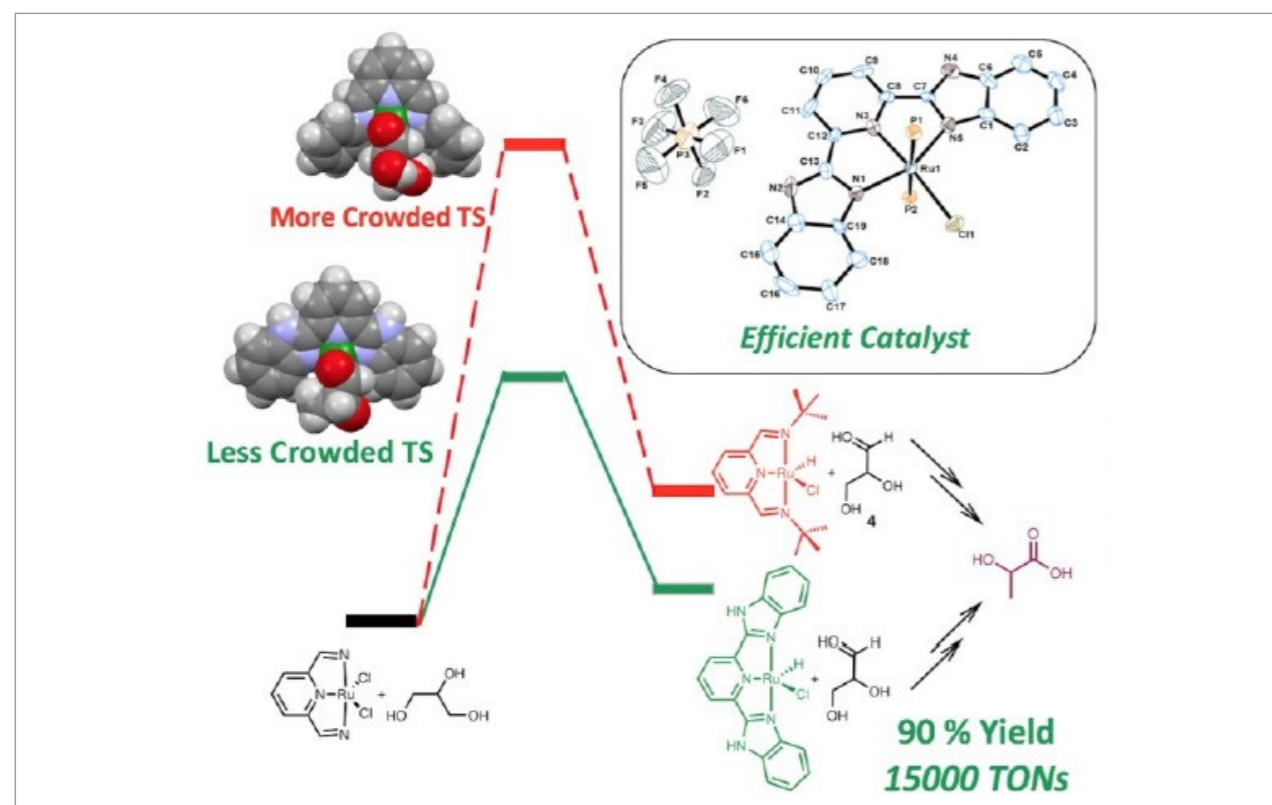


Figure 3: A sterically less hindered 2,6-bis(benzimidazole-2-yl)pyridine based pincer-ruthenium complex has been employed to accomplish the catalytic conversion of glycerol selectively to lactic acid in high yield.



Department of Medical Devices

Medical devices hold a key role in offering better screening, diagnosis and treatment of diseases along with restoration and monitoring of health indicators to boost prevention. Bringing innovative medical device technology to the marketplace is a high-risk venture. Medical device testing is a critical step in the process of transforming an innovative design into a reliable and marketable product.

Testing puts the product through a comprehensive medical devices industry assessment, and helps you demonstrate compliance with standards and regulations around the world. Testing helps identify the components that undergo timely degradation due to the device's exposure to external disturbances such as heat, shocks, vibrations and fluctuating environmental conditions. This analysis further helps predict equipment failure and perform calibration before any considerable damage. In other words, test and measurement equipment helps increase the shelf life, performance, accuracy and efficiency of devices. Testing labs will allow manufacturers to overcome deficiencies in their products and enhance product value in the market which is a neglected aspect until now.

The harmonization of standards, growing consumption of medical devices in emerging countries, increasing need of validation and verification for medical devices, the imposition of rigorous government regulations, the growing trend of outsourcing medical device testing services and standards across medical devices are a few of the driving factors for the medical device testing market.

NIPER-G help to make certain that the materials and products we test, inspect and certify for our customers are safe, quality, compliant and fit for purpose. Such facility is not existing in North East so far, hence it is paramount importance to establish such unique facility at NIPER-G.

Department of Medical Devices was established in 2020 to pursue interdisciplinary research and teaching with a focus on the development of new generation smart medical devices. Currently, the research topic includes, cold plasmas (CP) technology that can be generated at atmospheric pressure and at temperatures below 40°C have in the past couple of decades opened up a new frontier in plasma applications such as in Cancer treatment and tissue regeneration. These plasma sources produce agents, such as reactive species (radicals and non-radicals), charged particles, photons, and electric fields, which have impactful synergetic effects. Our interest is to develop biocompatible plasma devices such as soft plasma jet, pulse plasma jet and dielectric barrier discharge plasma and investigating its physical and biochemical mechanisms whereby cold plasma affects biological cells on macroscopic and microscopic scales. A thorough understanding of these mechanisms is bound to lead to the development of novel plasma-based medical therapies. Apart of that we also involved in the development of nanoscaffold microwells dish for the multicellular spheroid as well as organotypic 3D culture. Moreover, department has active collaboration with IIT-Guwahati, AMTZ-Vizag, and AIIMS-Guwahati.

Expertise available from Department of Medical Devices

- Development and characterization of soft plasma jet, pulse plasma jet and Dielectric Barrier Discharge Plasma.
- Development of Nanoscaffold microwells dish for the multicellular spheroid as well as organotypic 3D culture
- Development of a phytopharmaceuticals and plasma technology combination therapy against head and neck squamous cell carcinoma.
- Cleanroom experience (3D organoid developed form the stem cells, Wet bench etc) for tissue regeneration.
- Fabrication of Cold plasma-based device for the treatment of diabetic foot ulcer.

Faculty



Dr. Radhakrishnanand P.
Associate Prof. & Dept. in Charge
radha.krishnanand@niperguwahati.ac.in



Dr. Naresh Kumar
(Ramalingaswami Fellow)
nash.bms@gmail.com

Guest Faculty from IIT Guwahati



Prof. Utpal Bora



Prof. Subramani Kanagaraj



Prof. Cota Navin Gupta



Prof. Shivashankar B. Nair

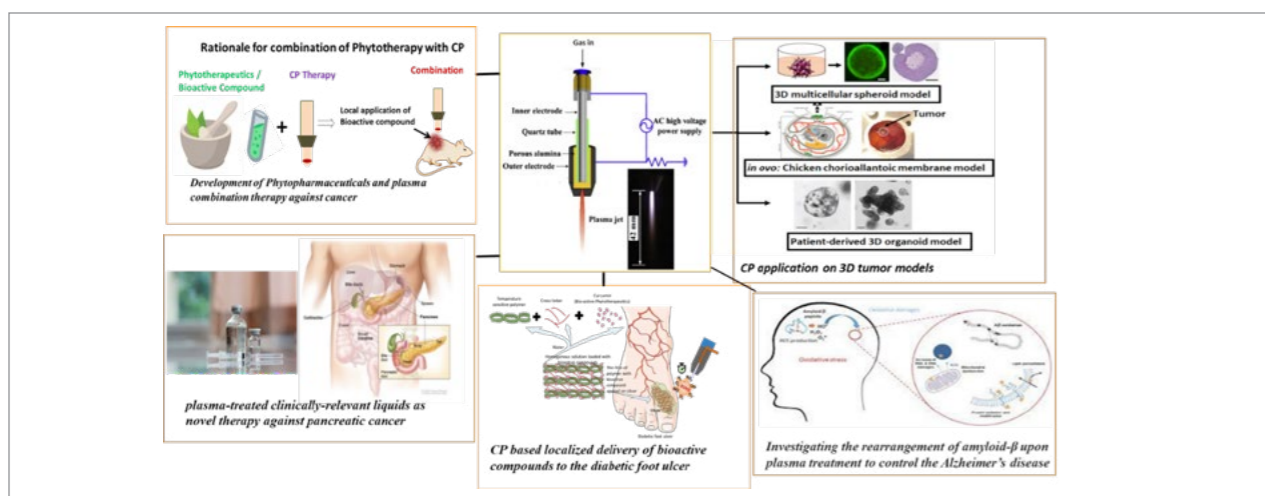


Prof. Harshal B. Nemade

Research Area 1

Development of biocompatible plasma devices such as soft plasma jet, pulse plasma jet and dielectric barrier discharge plasma and investigating its biomedical application.

Cold atmospheric plasma are used for medicine applications, like sterilization, clotting, wound healing and even cancer treatment. Additionally, atmospheric pressure plasmas will generate short-lived chemical species, which may be propelled toward the surface that's to be treated and an important feature of cold atmospheric plasma is its ability to produce a mixture of biologically active agents, such as reactive oxygen species and reactive nitrogen species, while remaining close to ambient temperature, which enables its safe application to sensitive materials like living cells and polymer. The plasma source for medicine applications should offer actually non-thermal plasma acting at atmospheric-pressure and close to the room temperature with none electrical and chemical risks. It should also be fascinating to utilize gases that are less costly, like air and nitrogen which don't stay once the treatment is completed.



Scheme: Development of Bio-compatible plasma for the clinical applications

In vitro plasma-exposed eukaryotic cells demonstrate several effects such as cell detachment, cell migration alteration, apoptosis or necrosis according to cell type and exposure parameters (power, time of exposure). Similar effects have been observed with cancer cell lines, including apoptosis and decreased cell migration. Studies even suggest that cancer cells are more sensitive to CP treatment than normal cells, concluding a selective decrease in cancer cell viability with less cytotoxic effect on nonmalignant cells. The understanding of the mechanisms responsible for this selectivity is based on several hypotheses that they depend on the basal intracellular level in reactive oxygen species (ROS), the expression of aquaporins, or more recently, on the cholesterol composition of the membrane. Thus, depending on the plasma doses and its requirement CP can be developed. Apart of cancer treatment. CP has been used in chronic wounds that effectively inactivate bacteria and to greatly reduce the bioburden in infected chronic wounds, making it a very attractive technology.

Research Area 2

Development of Nanoscaffold microwells dish for the multicellular spheroid and organotypic 3D model useful for tissue engineering, and disease modelling applications.

Scientific advances in 3D culture technology have afforded researchers the opportunity to address specific questions concerning complex in vivo organs in a dish. Three-dimensional (3D) culture systems encompass various organotypic cultures, such as 3D cell aggregates, tissue explants or slices, or 3D spheroid cultures. In comparison with 2D monolayer cultures, in which the maintenance of in vivo-like phenotype and function are hampered by a lack of cell-cell and cell-matrix interactions, 3D culture systems are able to mimic the in vivo microenvironment and to reproduce physiologically relevant cell-microenvironment interactions. However, there are still areas for improving 3D organotypic cultures: 3D cell aggregates often fail to show relevant tissue organization, and tissue explants or slices possess limited availability, because of the rapid loss of transient cell organization and the difficulty of long-term maintenance. Although 3D spheroid cultures show promise for sustained culture, they are often unable to assemble into complex structures in the absence of multipotent cells with the capacity of self-renewal and differentiation. In recent years, it was proposed that stem cell-based organoids can reduce a gap in the capabilities of existing 3D culture systems. Organoids are defined as a 3D structure consisting of organ-specific cell types that is self-organized from stem cells.

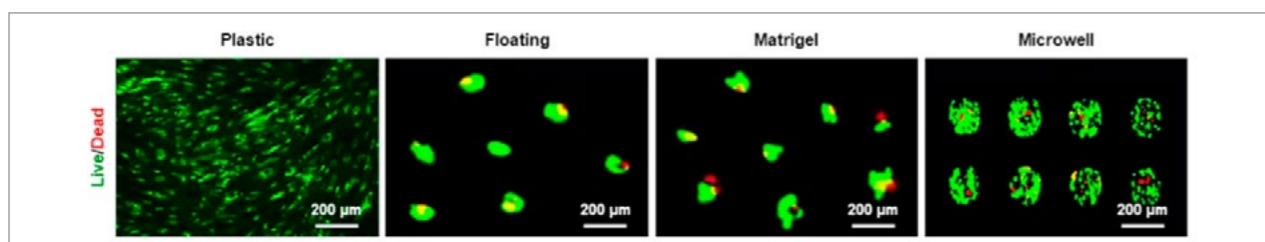


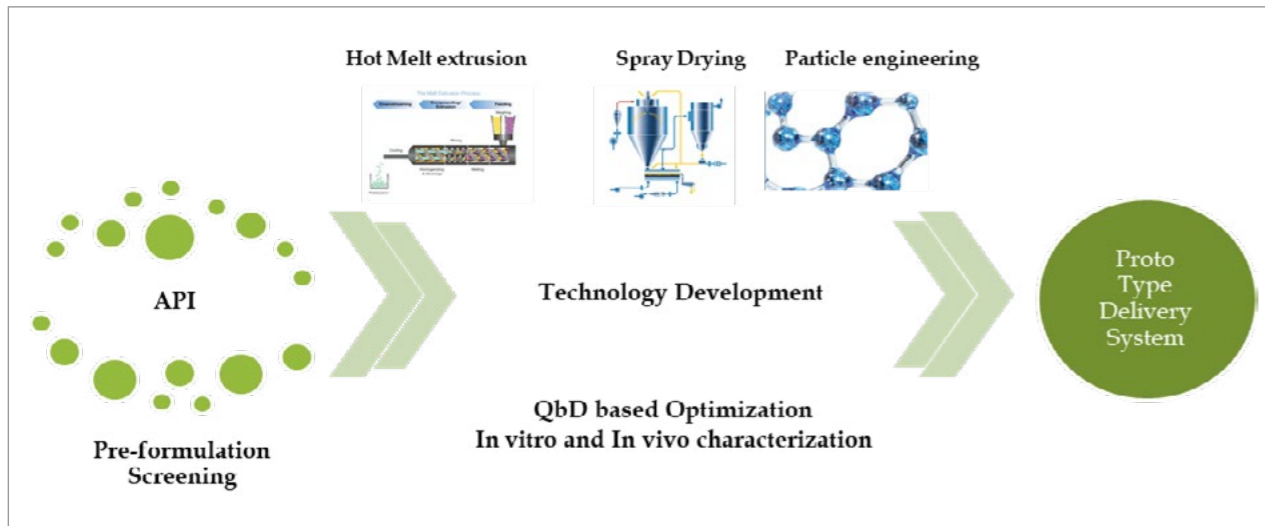
Figure: 3D spheroid formation under a priming (spheroid) culture: A representative LIVE/DEAD fluorescence image of hPCECs spheroids after culture for 5 days.



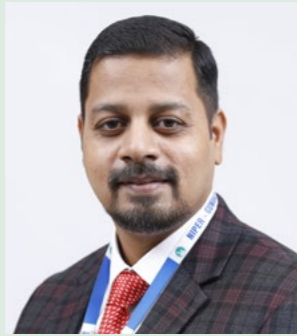
Department of Pharmaceutical Technology (Formulations)

Preformulation and formulation studies are critical for the success of potential new molecules with poor physicochemical properties such as solubility and permeability. Failure to attempt suitable drug delivery technologies at this may lead to elimination of a potent molecule. The fundamental understanding of physicochemical properties and preformulation screening with the objective to develop suitable technology will lead to development of successful delivery system. Further, successful Generic Drug Development necessitates the use of reverse engineering notion for the quantitative and qualitative analysis of drug and excipients of innovator product.

With this objectives, Pharmaceutical Technology (Formulations) Department major emphasis is to impart training to the students on the following thrust areas and make them industry ready.



Faculty Members from NIPER-G



Dr. Amit Alexander
Associate Professor & In charge
amit.alexander@niperguwahati.ac.in



Dr. Naveen Chella
Assistant Professor
naveen.chella@niperguwahati.ac.in

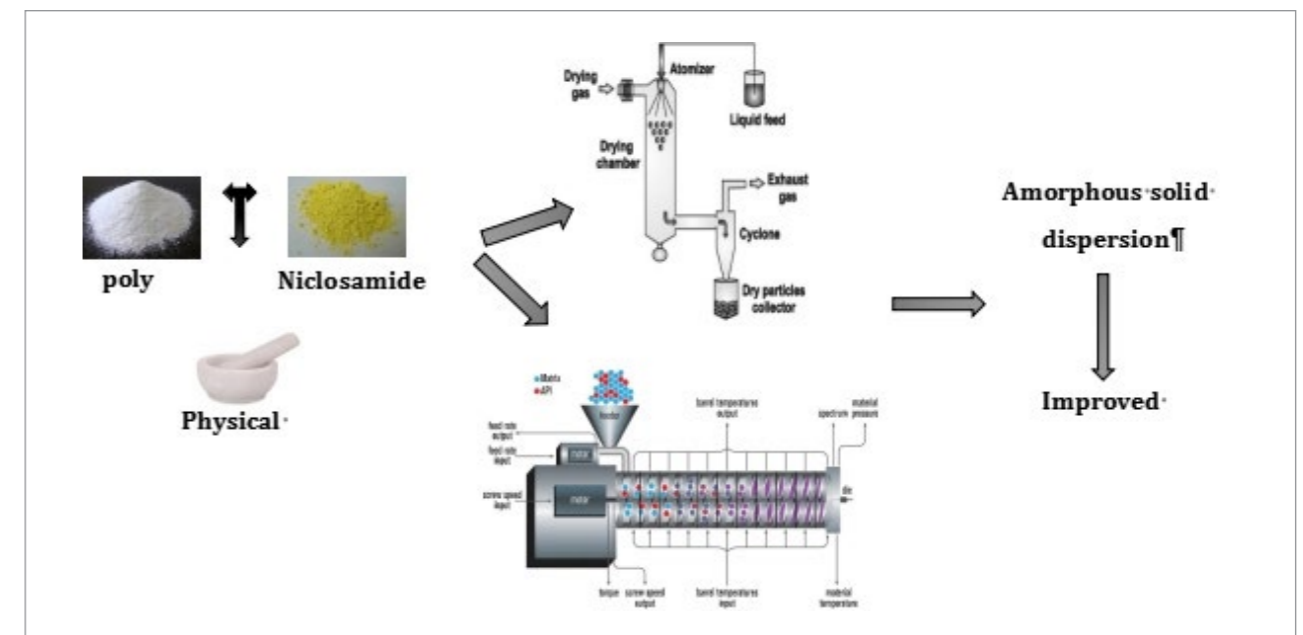
Major thrust areas

- Preformulation screening
- Developing prototype formulations for improved deliverability of BCS class II and IV molecules including natural bio actives using
- Spray drying
- Hot melt extrusion
- Lyophilization
- Particle engineering
- Dosage form optimization based on QbD principles.
- *In vitro in vivo* correlation analysis
- Amorphous drug delivery technology (amorphous solid dispersions, co-amorphous systems)
- Reverse engineering of a product's formulation to create Generic Drugs
- Herbal product developments
- Repurposed drug delivery
- Osmotic drug delivery systems
- Multi particulate drug delivery systems

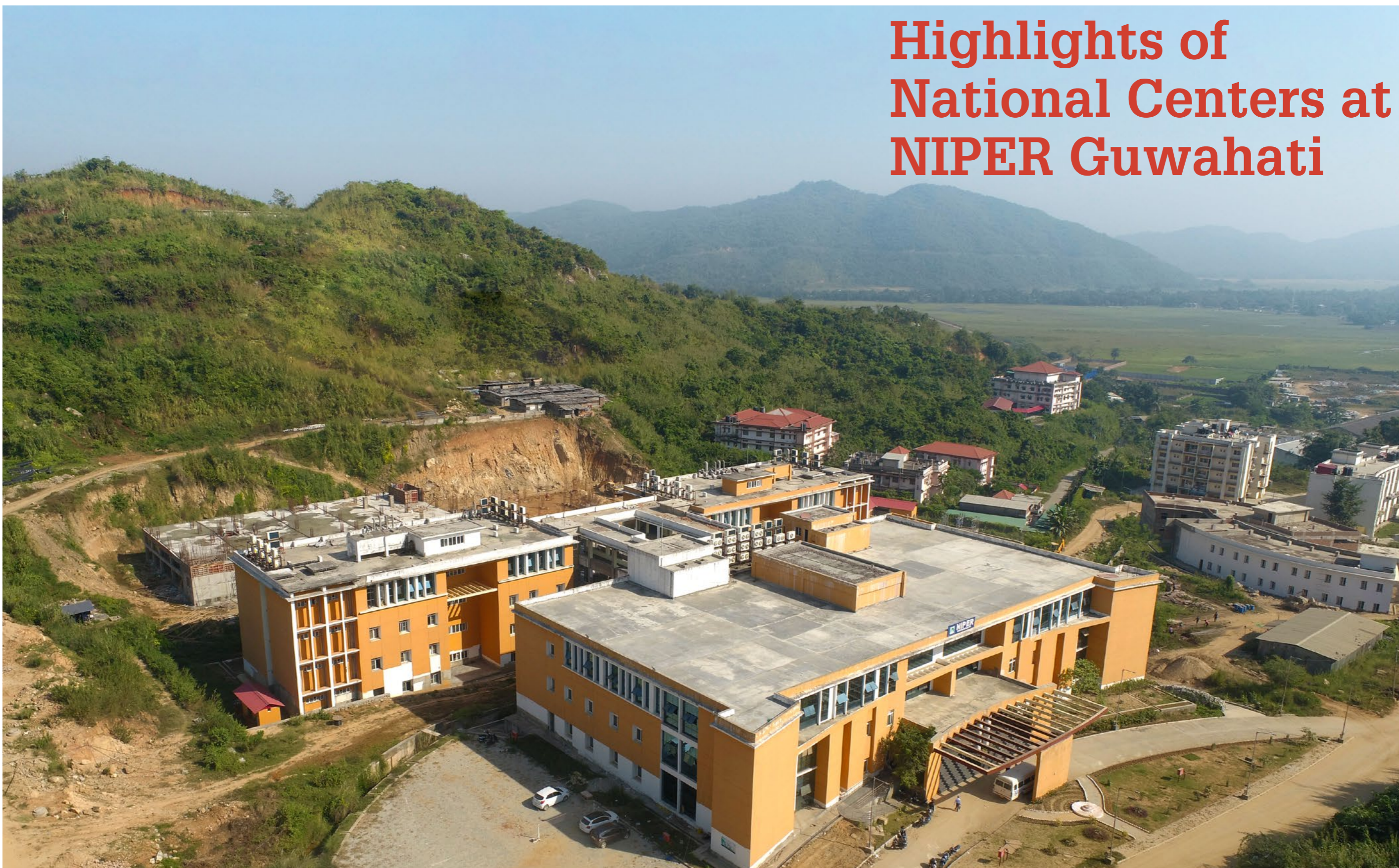
Research Area 1:

Generation of Amorphous Delivery Systems for improved dissolution of BCS class II drugs using spray drying and hot melt extrusion.

BCS class 2 drugs show poor dissolution which hinders their clinical effectiveness. Drug delivery systems with improved dissolution and solubility can enhance their clinical effectiveness. Supersaturation systems like amorphous solid dispersions can increase the solubility of hydrophobic molecules. However, stabilizing these amorphous systems is the concern for many pharmaceutical scientists. Our lab is working on the development of amorphous solid dispersions using different polymers and evaluating their in vitro dissolution, solubility and stability under accelerated conditions. Using niclosamide as a model drug, prepared solid dispersions using different polymers were characterized and devitrification studies also proved that a combination of hydrophilic and hydrophobic polymer will not only enhance the dissolution but also prolong the metastable condition in the dissolution media that will be helpful for the enhanced pharmacokinetics in vivo.



Highlights of National Centers at NIPER Guwahati



BioNEST INCUBATION CENTRE

(Funded by BIRAC, DBT, Govt. of India)

BioNEST Incubation Centre with state-of-art infrastructure at NIPER Guwahati, India, was established in 2019 by honorable Director, Dr. USN Murty. BioNEST connects industry and academia and provides services and mentorship for IP and Technology Management, Legal and Contract, Resource mobilization and Networking platform.

Focus area: Healthcare solution and Bio-innovation

VISION

- Aims to be among the world's foremost Bio-innovation Centre
- Support and assist budding entrepreneurs to compete in global market
- Create profitable, scalable and sustainable startups

MISSION

- Our mission to realise our vision by**
- Offering platform to talented entrepreneurs for pursuing their entrepreneurial ambitions through incubation
 - Imparting world-class mentorship

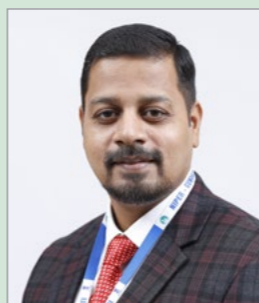
BioNEST Team



Dr. USN Murty
Chairman & PI



Dr VGM Naidu
Scientific Coordinator



Dr. Amit Alexander
Coordinator



Dr. Subham Banerjee
Scientific Coordinator



Dr. Sonali Roy
Incubation Manager



Dr. Priyanka Sharma
Scientific Officer

ACHIEVEMENTS

The relentless efforts of BioNEST Incubation Centre in conducting various awareness programmes across North East India to reach out the potential innovators, several innovators from different parts of NER became interested to incubate at NIPER-G and have applied for receiving seed funds from funding agencies.

Incubatees in the BioNEST Incubation Centre



Dr. Pritam Chattopadhyay, West Bengal
Ref No: BIRAC/KIIT0813/BIG-15/9
Project: Production of 'nature identical vanillin' from agro-wastes



Mr. Nilotpal Baruah, Assam
Ref No: BIRAC/KIIT01097/BIGSP/01/19
Project: Development of sensor-based myoelectric hand for amputees



Dr. Deepak Bharadwaj, NIPER Guwahati
Ref No: BIRAC/KIIT01116/BIGSP/01/19
Project: Nano-herbal formulation against superficial tumors of melanoma skin and breast origin



Dr. Sanjay K Banerjee, NIPER, Guwahati
Ref No: BIRAC/KIIT01134/BIGSP/01/19
Project: Development of nutritional product from Musa balbisiana for malnutrition

Women Incubatees



Ms. Geetashori Yumnam, Manipur
Green Biotech EcoSolutions Pvt. Ltd, Manipur
Ref No: BIRAC/KIIT01087/BIGSP/01/19
Project: Formulation of probiotics in poultry for sustainable livestock management



Ms. Pinky Paul, Meghalaya
Early detection of abnormalities in Post-COVID era by Artificial Intelligence

Traditional Healers in contact with BioNEST NIPER-G

Bio-NEST NIPER-G team also reached out to the members of Folk Medicine Healers Association of Assam from different districts of Assam such as Pathsala, Barpeta, Dhemaji, Dibrugarh, Jorhat and Kamrup, and also from Arunachal Pradesh and Manipur and generated their interest for mainstreaming their healing practices with support from the incubation center.



Chowlikham Pomong
Arunachal Pradesh



Hlranya Dev Goswami
Assam



Deba Kanta Konch
Assam



Ajit Borboruah
Assam



Sarat Chandra Patgiri
Assam



Amulya Choudhury
Assam



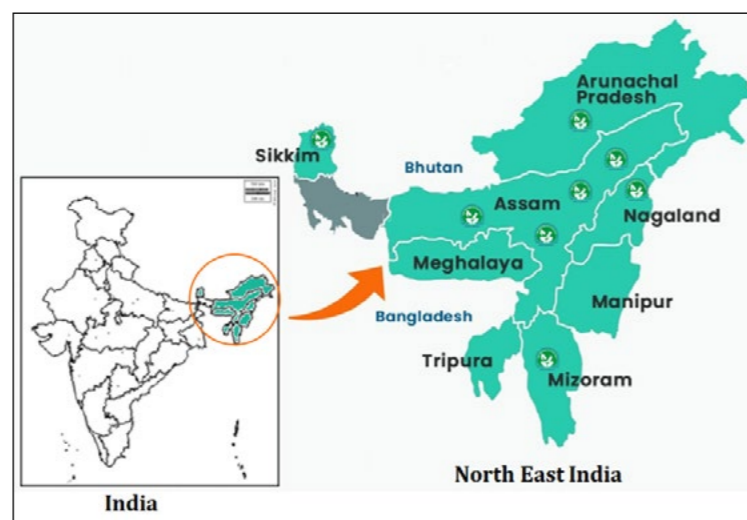
Mulan Buragohain
Assam



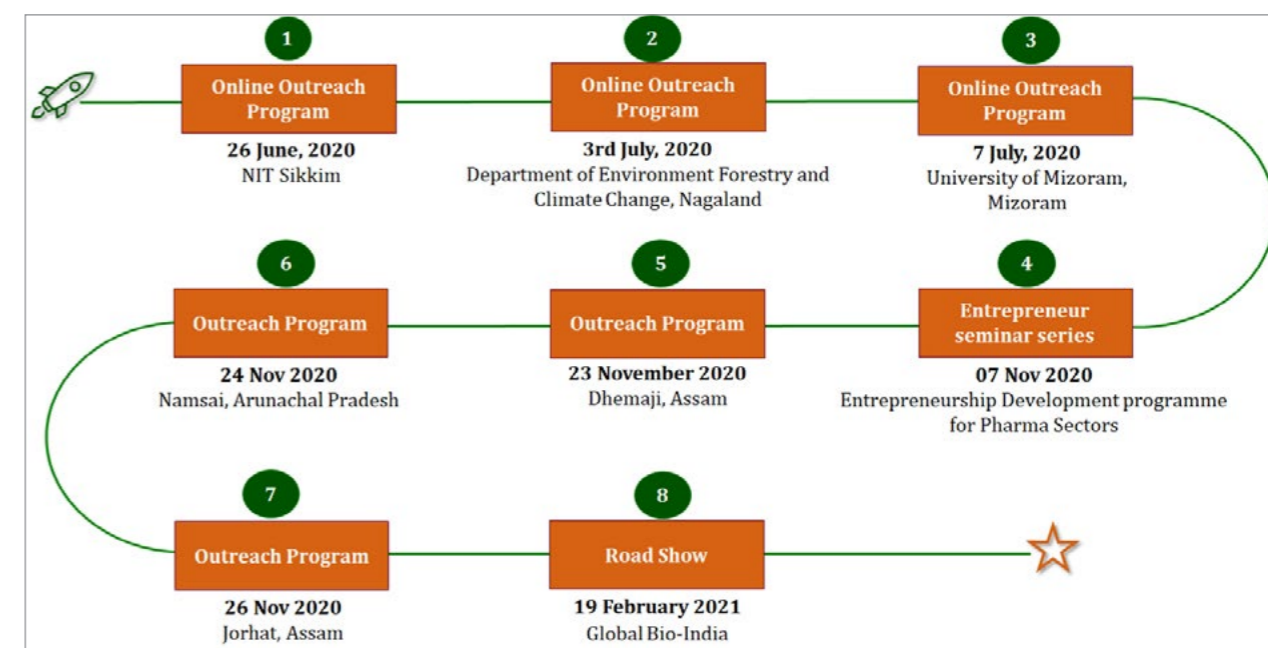
Thanu Gogoi
Assam

Workshops / Conferences / Seminars conducted under BioNEST Programme

BioNEST NIPER-G started proactive scouting for potential incubatees from the very beginning. It was noted that many innovators in North East India could not think for further steps due to lack of primary awareness about the support avenues. Hence vigorous awareness programs, workshops, road shows were conducted by BioNEST, NIPER-G. When the public gathering and movements were restricted due to Covid-19 pandemic, the Bio-NEST team continued the awareness programs through online mode.



BioNEST NIPER-G Footprint in North East India



Entrepreneurial activities across the North East region of India

Online Outreach Program for Sikkim on 26 June, 2020

Due to the pandemic condition Bio-NEST NIPER-G adopted the online method to conduct the outreach program. On 26 June, 2020 an Online Outreach program was conducted for the state of Sikkim in collaboration with National Institute of Sikkim. Dr Taraknath Kundu, Head, Department of Chemistry co-hosted the program. About 70 participants from NIT, Sikkim, Sikkim University, Sikkim Manipal University, MNNIT, Allahabad, Amity University,

Kolkata and NIPER-Guwahati students joined for the program. The talk of Dr Sonali Roy, Incubation Manager, Bio-NEST, NIPER Guwahati was followed by an interactive session. Participants from Sikkim and also outside NER are interested for incubation and avail the mentorship from NIPER-G Incubation Centre.

Online Outreach Program
Organized by Bio-NEST, NIPER-Guwahati
Supported by BIRAC, DBT, GOI
In Collaboration with NIT - Sikkim
Date: 26/06/2020

ONLINE OUTREACH PROGRAM
For Sikkim
Date: 26/06/2020

Organized by Bio-NEST, National Institute of Pharmaceutical Education and Research - Guwahati, Changsari, Assam
In Collaboration with National Institute of Technology - Barfung Block, Ravangla, Sikkim
Supported by BIRAC, DBT, GOI

ABOUT US
The Bio-NEST, NIPER Guwahati Incubation Center has been established to find out product driven entrepreneurs of North East region of India and to help them to grow and improve the scientific, entrepreneurial and economic development of NER.

Our Training & Support
Technical Support, Legal Support, Commercial Support, Financial Support

Local Organizer: Dr. Taraknath Kundu, HOD, Dept. of Chemistry, Call: 03595-260042/9674294774, Email: tkundu.nit.sikkim@gmail.com
Contact Us: Dr Sonali Roy, Incubation Manager, Call: +919678007196, Email: roysonali2005@gmail.com

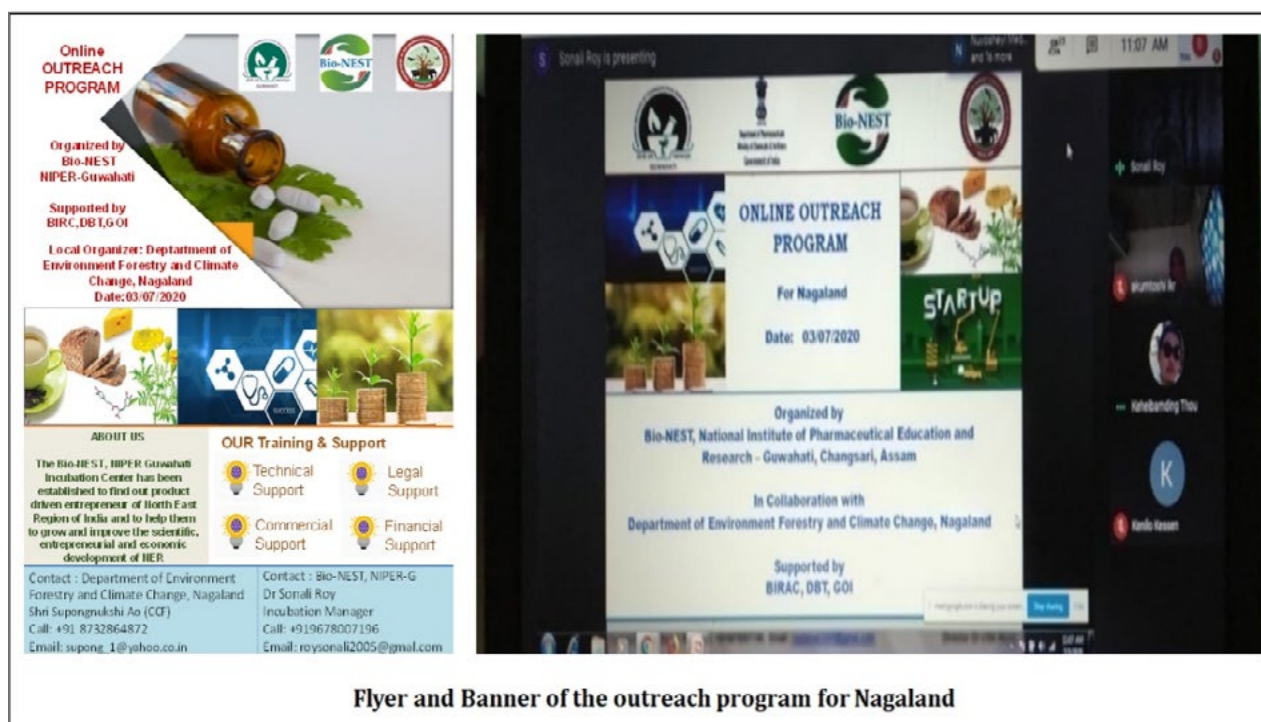
Contact Us: Dr Sonali Roy, Call: +919678007196, Email: roysonali2005@gmail.com, Director Dr USN Murty

Flyer and Banner of the outreach program for Sikkim

Online Outreach Program for Nagaland on 03 July, 2020

On 03 July, 2020 an online outreach program was conducted for the state of Nagaland in collaboration with Department of Environment Forestry and Climate Change, Nagaland. Sri Supongnukshi, IFS Chief Conservator of Forest, hosted the program as a local organizer for the program. About 105 participants from academics, startups, and individuals participated in the program. Dr Sonali Roy, Incubation Manager, Bio-NEST, NIPER Guwahati introduced the BioNEST Incubation Centre and

explained the opportunities available for entrepreneurship development. Sri Supongnukshi explained about the various types of activities taken by Government of Nagaland and Biodiversity board for the ecosystem development and the equitable benefit sharing. Participants were mostly interested for Medicinal Plant Cultivation and the Extraction, Organic food, Nutraceuticals and related Startups.



Flyer and Banner of the outreach program for Nagaland

Online Outreach Program for Mizoram on 07 July, 2020

In the first round of outreach program the last program was conducted for the state of Mizoram on 07 July, 2020 in online mode. The local organizer was Dr H Lalhrualtuanga, Assistant Professor, Department of Biotechnology, University of Mizoram. About 75 Students and Faculty members from different department of Mizoram University and their incubation center and different Startups were participated in the program. A brief talk was delivered by Dr Lalhrualtuanga about the Mizoram University and its mission towards the entrepreneurship development.

His talk was followed by the presentation of Dr Sonali Roy, Incubation Manager, Bio-NEST, NIPER-Guwahati. Participants were interested on the seed fund availability, grant writing techniques and mentorship from Bio-NEST NIPER-G. Some of the participants requested the NIPER-G incubation manager to conduct workshop at Mizoram University. Bio-NEST NIPER-G is planning for the workshop at Mizoram University once the pandemic situation become normal.



Flyer and Banner of the outreach program for Mizoram

Entrepreneurship Development programme for Pharma Sectors on 07 November, 2020

Bio-NEST, NIPER-G organized an 'Entrepreneurship Development Seminar series for Pharma Sector, Part-I' on 07 November 2020. This seminar is supported by the BIRAC, DBT, Govt. of India. A total of 750 delegates

participated in the seminar, principally from the North East region. The YouTube link is:

https://www.youtube.com/watch?v=sCh_KXcW3yQ



More than 750 delegates participated in the seminar from all over India, principally from North East

You missed the seminar? you can still listen the experience and ideas from the leading entrepreneurs here
https://youtu.be/sCh_KXcW3yQ

Entrepreneurship Development Seminar series for Pharma Sector

Outreach Program at Dhemaji, Assam on 23 November, 2020

On 23 November 2020, BioNEST, NIPER-Guwahati Incubation Centre conducted an Outreach Program at Dhemaji in collaboration with Folk Medicine Healers Association Assam. The program was graced by renowned reporter and writer Sri Umesh Chetia. Total 36 numbers of participants came from different district of Assam.

On behalf of Bio-NEST NIPER-G, incubation manager Dr Roy explained about the Incubation process, mission of

NIPER-G on the establishment of herbal formulation from traditional healers through scientific validation and their commercialization, and also the benefit sharing strategy. Traditional healers namely Sri Deba Kanta Konch, Sri Mulam Buragohain and Sri Thanu Gogoi submitted their formulation to NIPER-G team members for scientific validation. They have also signed the MoU with the Bio-NEST NIPER-G Incubation Centre as Incubatee under Traditional Healers category.



Online Outreach Program at Dhemaji, Assam

Outreach Program at Namsai, Arunachal Pradesh on 24 November 2020

Bio-NEST, NIPER-Guwahati Incubation Centre conducted an Outreach Program at Namsai of Arunachal Pradesh with the local traditional healers on 24 November 2021. On behalf of Bio-NEST NIPER-G, incubation manager Dr Roy explained about the BioNEST NIPER-G Incubation centre and the mission of NIPER-G on the establishment of herbal formulation from traditional healers through

scientific validation and their commercialization, and also the benefit sharing strategy. Traditional healers Sri Chow Likham Pomong submitted his formulation to NIPER-G team members for scientific validation. He also signed the MoU with the Bio-NEST NIPER-G Incubation Centre as Incubatee under Traditional Healers category.



Online Outreach Program at Namsai, Arunachal Pradesh

Outreach Programme in Jorhat, Assam on 26 November 2020

On 26 November 2020 BioNEST, NIPER-Guwahati Incubation Centre conducted an Outreach Program at Meleng, Jorhat. The program was graced by veteran traditional healer Jibeswar Borpatra Gohain. On behalf of Bio-NEST NIPER-G, incubation manager Dr Roy presented the current activities and explained about the Incubation process. She also discussed about the methods for the establishment of herbal formulation from traditional healers

through scientific validation. Sri Datta M Pawde presented method to use herbal medicines and the pros and cons of the herbal medicine. Traditional healers Sri Ajit Borbarua submitted his formulation to NIPER-G team members for scientific validation and also signed the MoU with the Bio-NEST NIPER-G Incubation Centre as Incubatee under Traditional Healers category.



Outreach Programme in Jorhat, Assam

Global-Bio India Roadshow 2021 on 19 February 2021

BioNEST NIPER-G Incubation Centre conducted a virtual Global-Bio India Roadshow 2021 on 19 February 2021 with support from BIRAC, DBT Gol. Eminent speakers from DBT BIRAC, including Dr. Artee, Senior Manager, BIRAC and Ms. Poonam Bishnani, Sr. Officer, BIRAC, talked about the BIRAC initiatives to strengthen the Bio-Innovation ecosystem of India and also about the Global-Bio India program. Personalities from industries such as Dr. Vijayvitthal T Mathad, Sr VP-R&D, MSN Laboratories and Dr Pradip Majumdar, Scientist &

Entrepreneur, Harvard Medical School, Boston, USA and Co-Founder, M/s Accurius Therapeutics & M/s Mitra Biotech/ Farcast enlightened about the current trends of technical innovations in healthcare industries and possible opportunities for entrepreneurship. Participants were enthusiastic to know about start-ups and incubations, the funding systems available from BIRAC, other facility and hand holding provided by Incubation Centre.



Global Bio-India Roadshow 2021
Organized by Bio-NEST, NIPER Guwahati | Supported by BIRAC, DBT, GOI
Date: 19.02.2021 | Time: 2.30 PM to 5.00 PM

Speakers

- Dr USN Murty, Director, NIPER-G
- Dr Artee, Sr. Manager, BIRAC
- Ms Poonam Bishnani, Officer, BIRAC
- Dr Vijayvitthal T. Mathad, Sr VP - R&D, MSN Laboratories
- Dr Pradip Majumdar, Scientist & Entrepreneur

Registration link:
https://docs.google.com/forms/u/1/d/1L5m00bLChJGrr3j9QYciBmZRuCDCsnQlw00bTIC_HaQ/edit?usp=forms_home&ths=true
Contact us: # 9678007196, 9986779870, niperguwahatibionest@gmail.com, incubation.manager@niperguwahati.ac.in

National Institute of Pharmaceutical Education and Research, Guwahati
Sila Katamur (Halugurisuk), P.O.: Changsari, Dist: Kamrup, Assam, Pin: 781101, India

Global-Bio India Roadshow 2021

Events

Bio-NEST, NIPER-Guwahati Ideathon Challenge floated in October 2020

BioNEST Incubation Centre conducted Ideathon Challenge that floated in October 2020. The aim of the Ideathon is propelling the innovators of North East India towards the challenges of bio-innovation sector. This is designed to offer recognition and financial support to technology innovators and entrepreneurs who have been working in the bio-business sector and/or facilitate a promising technology idea that can be converted into a handy technology in a defined time limit. The theme included any idea/ innovation related to health care and other fields of

biotechnology including food, agriculture, industry etc. The winners were awarded with a token amount of prize money and pre-incubation support of worth 2 lakhs for a period of six months.

The winners were as follows:

- 1st prize: Mr. Somnath Chanda
- 2nd prize: Dr. Atish Ray
- 3rd prize: Mr. Abhishek Saha

Contact details

Dr. USN Murty, PI, Director

Dr. Amit Alexander, Coordinator

Email: director@niperguwahati.ac.in

amit@niperguwahati.ac.in

NIPER Guwahati, Changsari, Silakatmur, Guwahati, Assam, India

National Centre For Pharmacoengineering (NCPE)

A State-of-the-art facility

Funded by

Drugs and Pharmaceuticals Research Programme (DPRP),
Department of Science & Technology (DST),
Ministry of Science & Technology, Government of India.

About NCPE:

The National Centre for Pharmacoengineering (NCPE) came into existence under the able stewardship of Dr. USN Murty at NIPER Guwahati in 2019 as a state-of-the-art infrastructure facility focusing & promoting on the cutting edge next generation engineered translational healthcare medicines through the dissemination of advanced pharmaceutical knowledge for multiple benefits.

The target areas of this center carefully chosen to cater the commercially neglected albeit fatal diseases (Tropical neglected diseases). Such diseases do not attract much industrial investment but require dedicated intervention especially in the North-Eastern Region (NER) of India with tropical climate.

Background:

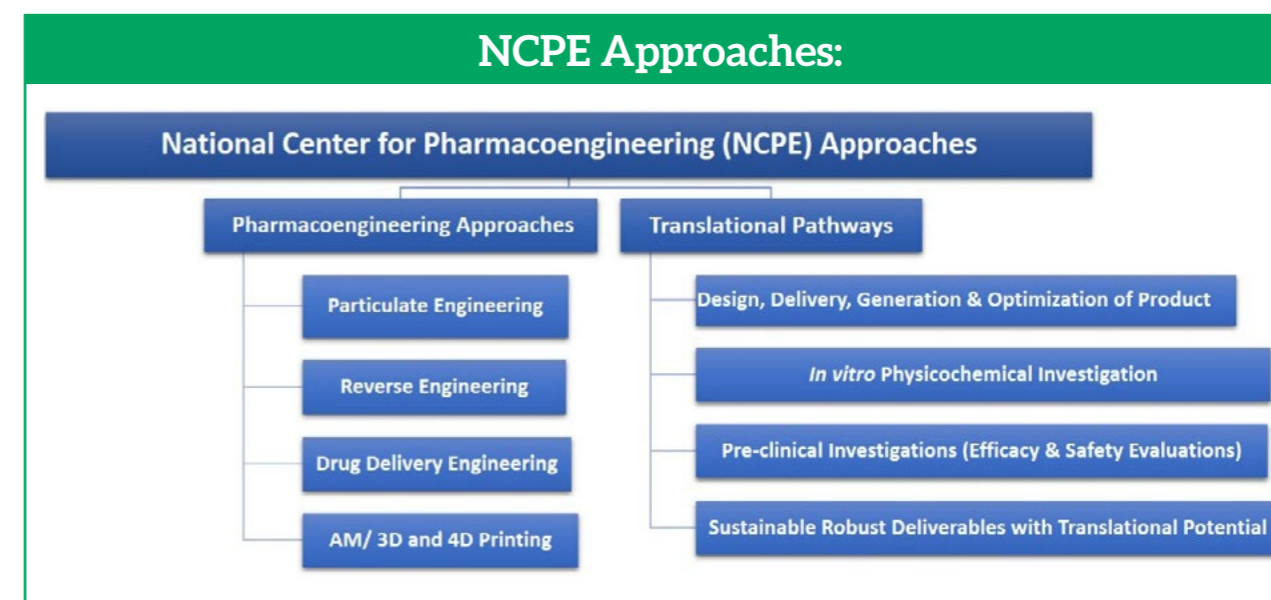
NIPER Guwahati is an Institute of Prime Importance pursuing excellence in the knowledge dissemination and innovation in the field of Pharmaceutical Sciences. The Institute has made significant strides forward in the recent times in fostering the traditional and biodiversity riches of the North-East region of India and established an array of platforms to facilitate the translation of tribal knowledge into Tangible Intellectual Property. The NCPE aims to follow up on our achievements with another step towards innovation through a marriage of engineering acumen with pharmaceutical research.

Vision and Mission:

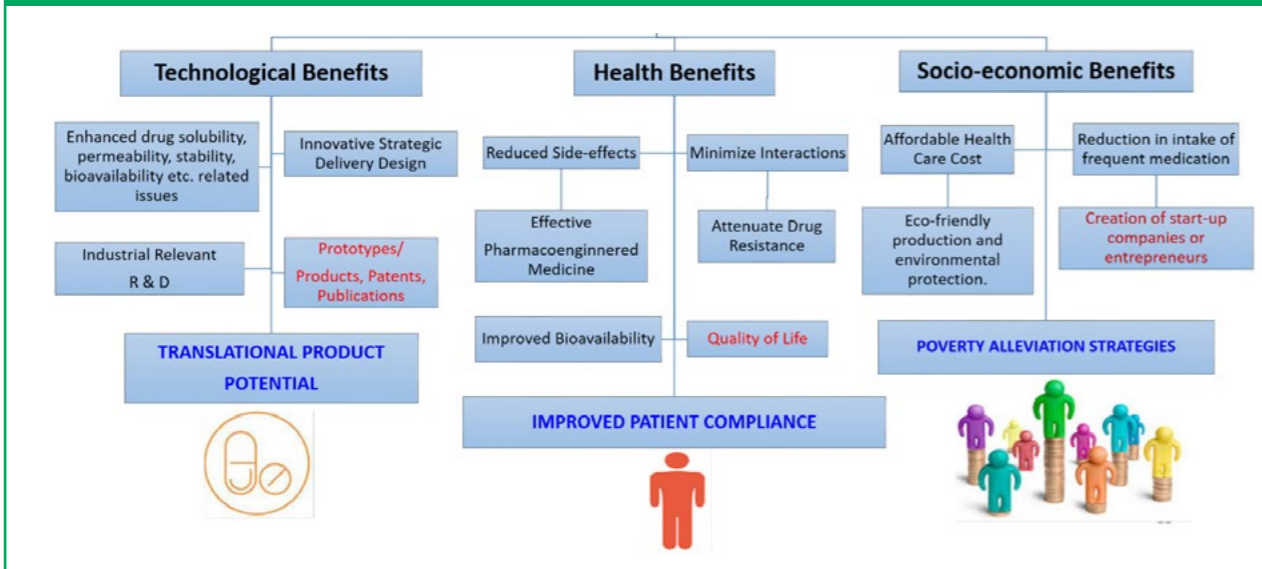
Centre of Pharmacoengineering NCPE envisions to be a National Center of excellence state-of-the-art infrastructure in promoting high standard cutting edge pharmaceutical engineering and translational biomedical research for the ultimate benefit of the society and pharmaceutical industries. The translation of the research outcomes into considerable benefit of the society and ultimately improving the "quality of life" of Indian citizens with particular emphasis on the North-east region of our country.

"A Pharmaceutical Center of Excellence in Unique Therapeutic Intervention addressing Community and Societal issues (PHARMACEUTICS)

NCPE Approaches:



Proposed Outcomes:



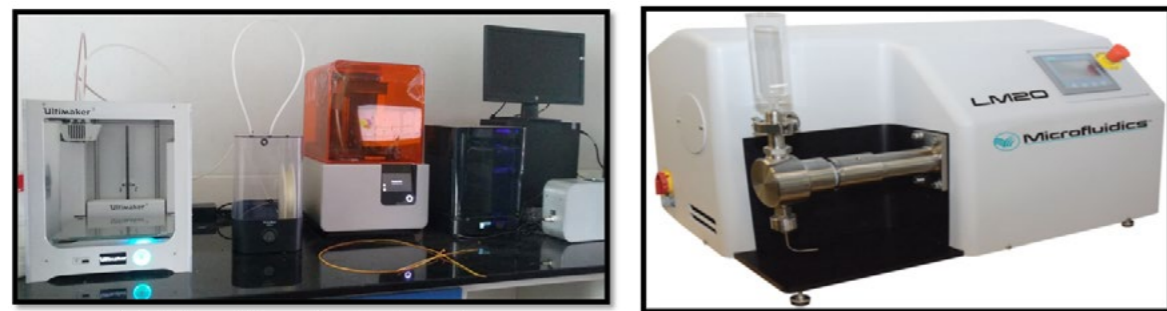
NCPE Success Stories:

Technology Transferred: Design granted & patented "A face protecting device" signed for the mutual non-disclosure agreement, & technology is transferred to Hindustan Antibiotics Limited (HAL, a Govt. of India Enterprise under Ministry of Chemicals and Fertilizers, Govt. of India), Pimpri, Pune, Maharashtra.



Granted Design Patent Granted Research Patent High-impact Publications 3D Printing World Awards

Additive Manufacturing/3D Printing & Developed Prototypes:



Next Generation Personalized 3D Formulations



NCPE Contributions during COVID Outbreak:



Beneficiary:

- The spare time of common instruments in NCPE, NIPER-Guwahati offered to various academic, R & D institute/organizations and industries on a cost-sharing basis.
- Training of science and pharmacy graduates in the state-of-the-art research facilities.
- Providing facility & capacity building to researchers, trainees, and motivated aspirants of NER.

Contact Details:

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Dr. Subham Banerjee, Co-PI & Coordinator
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 subham.banerjee@niperguwahati.ac.in
 Phone: 0361296112; 9599878950
 NIPER Guwahati, Changsari, Silakatmur, Guwahati, Assam, India.

Animal Breeding Centre & GLP-accredited Biological Screening & Toxicology Centre

A State-of-the-art facility

Funded by

- Ministry of DoNER, Govt. of India

ABOUT ANIMAL HOUSE FACILITY

Preclinical research involving animals plays a paramount role in drug discovery and to improve the well-being of humans. In every area of drug discovery programme (from low molecular weight synthetic molecules to high molecular weight recombinant proteins and complex herbal mixtures) research with animals are essential and are being conducted under GLP accredited facilities. Screening of drugs in GLP accredited facilities is a mandatory requirement for both national and international regulatory bodies including India. NIPER Guwahati will be establishing a state-of-the-art animal house with breeding facility and GLP accredited toxicology centre to cater the evaluation of efficacy, safety, toxicity and pharmacokinetics of molecules from herbal or synthetic origin as a tangible outcome to cater the need of the R & D organizations, pharmaceutical and biotechnology industries under the STINER programme by the Ministry of Development of North Eastern Region (DoNER), Govt. of India.

VISION

- To be an institution of excellence in promoting high standard pharmaceutical education and research by providing state of the art facility to cater the need of the R & D organizations, pharmaceutical and biotechnology industries.

MISSION

- To cater the high quality laboratory animals for drug discovery
- To provide state of the art facility by imparting the standards of GLP and guidelines outlined in compendium of CPCSEA, Govt. of India to meet the expectations of regulatory agencies

- To cater the needs of pharmaceutical industry and other research organization

OBJECTIVES OF THE CENTER

- Establishment of Animal House and Breeding facility to provide high quality pathogen free animals of various strains of rats (Sprague-Dawley & Wistar) and mice (Swiss, Balb/C & C57BL6), hamsters, guinea pigs and Rabbits for internal use and other institutions in NE region.
- Establishment of state of the art facility with standards of GLP to cater the needs of Pharma and Biotech industries as per regulatory standards.
- To evaluate the efficacy, safety, toxicity and pharmacokinetic studies of molecules or traditional medicines from herbal or synthetic origin.
- To impart training through conducting skill development programs in small animal handling and maintenance to meet as per the pharma industry needs.

EXPECTED OUTCOMES

- NIPER-G can be a nodal agency to supply quality animals to all educational and R&D organizations in the North-East India for drug development and research.
- This center will be big boost for making NE traditional healers and other small entrepreneurs to accelerate their drug discovery program with concrete scientific evidence with the help of NIPER G.
- Opportunity to establish collaborative/contract research with Pharma Industries with special emphasis to validate drug candidates

EXPERTISE

Pharmacological Screening

- Pain
- Inflammation (arthritis, colitis & psoriasis)
- Diabetes and its complications
- Cardiovascular diseases
- Cancer
- Fibrosis (Renal, cardio & Pulmonary)
- Metabolic disorders
- Pulmonary pharmacology

Safety and Toxicity studies

- Regulatory (OECD)
- Genotoxicity (Micronucleus)
- Nephrotoxicity
- Hepatotoxicity
- Cardiotoxicity

PK/PD studies

- Pharmacokinetic studies
- Bioavailability studies
- Drug distribution studies

FACILITIES WOULD BE CREATED

- The Animal House with breeding facility and GLP accredited Toxicology Centre is designed an area of 1000 sq meter, following the GLP standards in construction, maintenance and operation.
- Adequate facility for animal species rats (Sprague-Dawley & Wistar) and mice (Swiss, Balb/C & C57BL6), hamsters, guinea pigs and Rabbits.
- Clean and return corridor systems
- Dedicated AHU system and acceptable standard of air quality (Class 100,000 facility) with HEPA filters
- Fully equipped with Individual Ventilated Cages (IVCs)
- Full equipped and dedicated procedure room and necropsy rooms
- Dedicated quarantine, feed and bedding storage areas
- Dedicated wash area and double door autoclave for sterilization of materials, cages etc
- All safety provision including fire safety, CCTV and Access Control Systems
- Temperature and humidity control system
- Light control system simulating natural 12h light : 12h dark cycles
- Pressure differential systems across different areas in the animal house
- Biomedical waste management
- Full time veterinarian for veterinary care to the animals

State-of-the-art instruments



IVC Cages



Microtome and Cryotome facility
histopathology studies



Whole body plethysmograph



Preclinical Imaging System
FUJIFILM VisualSonics_Vevo
3100



In-vivo imaging system IVI
Spectrum_Perkin Elmer



Quantum-GX2-microCT-imaging-
system_Perkin Elmer



Hematology Analyser_Siemens



Automated Blood Sampling
System



Triple Quad LC-MS/MS



Flexstation3 multimode reader_Molecular Device

Beneficiaries

- R & D Organizations involved in drug discovery
- MSME (Micro, Small & Medium Enterprises)
- Drug discovery start-up industries
- Pharma and Biotech Industries
- Contract Research Organization (CRO)

WHAT SUPPORT NIPER-G CAN PROVIDE

- Scientific and technical support
- Infrastructure and State of the art facility with standards of GLP to conduct preclinical studies
- Advanced instrumentation facility for safety, efficacy, pharmacokinetic and toxicology studies

Contact details

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NIPER Guwahati, Changsari, Silakatmur, Guwahati, Assam, India

GMP Extraction Facility

Sponsored by DBT, Govt. of India

About The Centre

GMP accredited Pilot Scale Extraction facilities was established with the objective to develop Herbal or Phytopharmaceutical products from the Medicinal Plants of North Eastern India and is funded by Dept. of Biotechnology (DBT), Govt. of India. It is further integrated with Quality Assessment & Value Addition Centre for the herbal industry in the North Eastern States of India, by Ministry of Commerce, Govt. of India under TIES Programme.

Why GMP extraction facility is required??

Northeast India has the richest plant biodiversity where medicinal plants account for higher percentage of contribution. Being a hub of natural resources, many medicinal plants are endemic to Northeast India and possess wide variety of therapeutic activities. However, many plants are used as tradition medicine by many tribes and traditional healers and none of these have standardised

extraction process, quality tests, formulations to maintain the uniformity of dose that leads to their clinical success. Hence, there is strong need for the facility that can avail the natural resources available and convert them into clinically viable formulations. Extraction and standardization of herbal preparation under GMP conditions ensures that products are consistently manufactured and maintained according to quality standards. This also minimizes final product rejections and saves cost to the manufacturers. This will provide employment opportunities which spurs economic growth among the local community.

Vision and Mission

- To provide quality, safety and efficacy to the herbal extracts using GMP facility.
- Use of standardized and validated procedures minimizes the batch to batch to variability and reduces the wastage.



Objectives of the centre

- To establish a GMP accredited Pilot Scale Extraction facilities for the development of Herbal or Phytopharmaceutical products from the Medicinal Plants of North Eastern India.
- To provide support to the companies and entrepreneurs in the production of value-added products such as standardized herbal extracts at the pilot level to mimic the exact condition of the herbal industry.
- To support local communities and tribal in establishing the value addition to the locally available herbal medicinal plants.

Expected outcomes

- Support system for the entrepreneurs and start-ups especially in the Northeast area.
- Ready to use cGMP based pilot plant facility for the production of herbals starting from extraction to formulation.

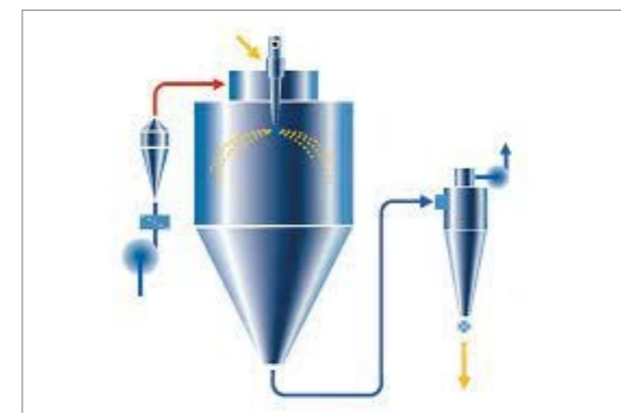
Facilities available / would be created

NIPER Guwahati under this centre is planning to establish the following

1. Size reduction of raw materials (mills, shredders, scrubbers etc.)
2. Extractors of 100 L capacity along with chillers and evaporation facility as per GMP standards
3. Dryers 9Spraydryer, vacuum dryer etc)
4. Size reduction units for final product (bead mills, pulverisers etc)
5. Packaging unit for the raw material and finished product
6. SFE extraction unit with capacity of 1 and 5 L



GMP extraction facility



Spraydryer



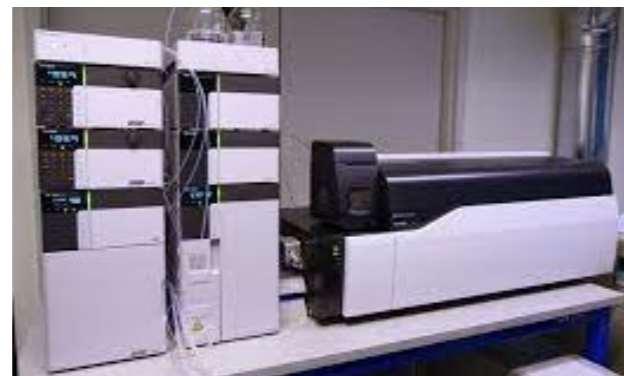
Vacuum dryer

Supporting centers

1. Quality control and Quality Assessment (Formulation) unit supported under TIES scheme by Ministry of Commerce, Govt. of India.
2. GLP accredited Toxicology and Efficacy testing facility supported under STINER programme by Ministry of DoNER, Govt. of India.



QC laboratory



LC MS



Bottle Filling machine



Tablet Compression Machine

Beneficiary of the facility

- Entrepreneurs
- Start-ups
- Traditional healers
- Local research fraternity including academicians, research students
- Small and medium scale companies

What support NIPER G can provide

Apart from the infra structure facilities, NIPER G can provide mentor ship with respect to scientific knowledge required for the standardization, extraction, formulations, quality testing etc, based on the expertise available.

Contact details

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NIPER Guwahati, Changsari, Silakatmur, Guwahati, Assam, India

ADR Monitoring Centre

(Pharmacovigilance Programme of India (PvPI))

Ministry of Health and Family Welfare, Govt. of India)

The Indian Pharmacopoeia Commission (IPC), Ghaziabad, National Coordination Centre for Pharmacovigilance Programme of India (PvPI) has approved NIPER Guwahati as an Adverse Drug Reaction Monitoring Centre (AMC) in February 2021.



Focus Area:

Pharmacovigilance

Vision of PvPI

- To improve patient safety and welfare of Indian population by monitoring safety of medicines, thereby reducing the risk associated with their use.

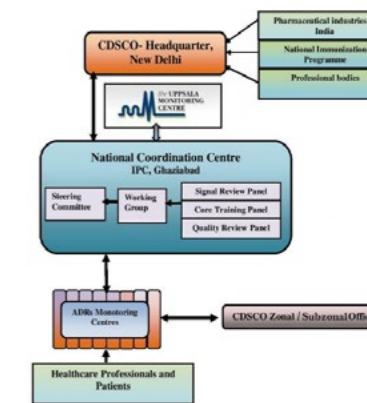
Mission of PvPI

- To safeguard the health of Indian population by ensuring that the benefits of use of medicine outweigh the risks associated with its use.

Scope and Objectives of PvPI

- To create a nation-wide system for medicine safety reporting and monitoring
- To support national drug regulators in the decision-making process on use of medicine
- To generate evidence-based information on safety of medicine
- To analyze the benefit-risk balance of marketed medicine
- To promote quality and safe use of medicine
- To emerge as a Centre of Excellence for Pharmacovigilance

Adverse Drug Reaction (ADR) Reporting in India



Contact details

Dr. USN Murty, PI, Director

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Dr. Ramu Adela, Deputy Coordinator

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NIPER Guwahati, Changsari, Silakatmur, Guwahati, Assam, India

Center of Excellence Scheme

Ministry of Tribal Affairs,
Govt. of India



Centre of Excellence as defined by the Ministry of Tribal Affairs, Government of India, is an institute or organization of national or international acclaim that focuses on research for the growth of tribal communities. Centre of Excellence (CoE), under the Ministry of Tribal affairs (MoTA), Govt. of India together with NIPER-Guwahati is conducting Outreach programs and Health camps in tribal areas in North-east (NE) India, to promote health care in the region since 2018.

Focus area: Indigenous medicinal plants of NE region, health care of tribal communities

Vision

- To gather knowledge on traditional medicines used and practiced by traditional healers
- Create skilled manpower by focussing on skill development programs among tribal population
- To promote health awareness among the tribal population of NE India.

Mission

Our mission is to promote health awareness via outreach programs and impart skill development programs to tribal students through workshops and demonstrations. NIPER-G will serve as a great platform for the traditional healers of North East India to commercialize their products with

proper scientific validation and regulatory compliances.

Achievements

On 26th August 2018, NIPER-Guwahati had organized a Traditional Healers Meet where healers from 6 NE states participated to showcase their products prepared by traditional methods. It was aimed at enabling traditional health practitioners to become agents of change in their communities and facilitated networking to build good relations. In recent years, the Department of Pharmacy Practice, NIPER Guwahati has initiated tribal health camps and skill development programs for tribal students in the NE states to collect traditional medicine information from the tribal population. This programme has helped the tribal people to strengthen the traditional medicine practices by providing scientific validation to existing literature and preclinical validation, formulation development, analytical support and clinical validation.

Impact created on the tribal population:

- We have conducted 10 health camps and awareness programs where we identified the health illnesses and traditional medicine usage by the tribal population. These programs were helpful to understand the socioeconomic status of the tribal population.

- Five Skill development programs imparted to Scheduled tribe students to create skilled manpower necessary for the pharmaceutical industry needs in the North-eastern states. Our program helped critical thinking & problem solving, ability to take responsibility, boost confidence, and improve decision making power. Altogether this knowledge will help to get a good job in the pharmaceutical industry and support the Northeast pharmaceutical industry development.
- Medicinal plants chemical components were measured by using advanced analytical instrumentation facilities like GC-MS and LC-MS/MS.
- We identified commonly used medicinal plants by tribal population in Assam and validated scientifically to prove their efficacy and safety.



Health awareness camps conducted at different tribal localities of Assam

QA & Value Addition Centre for Herbal Industry in the Northeastern States of India

About NIPER - Guwahati

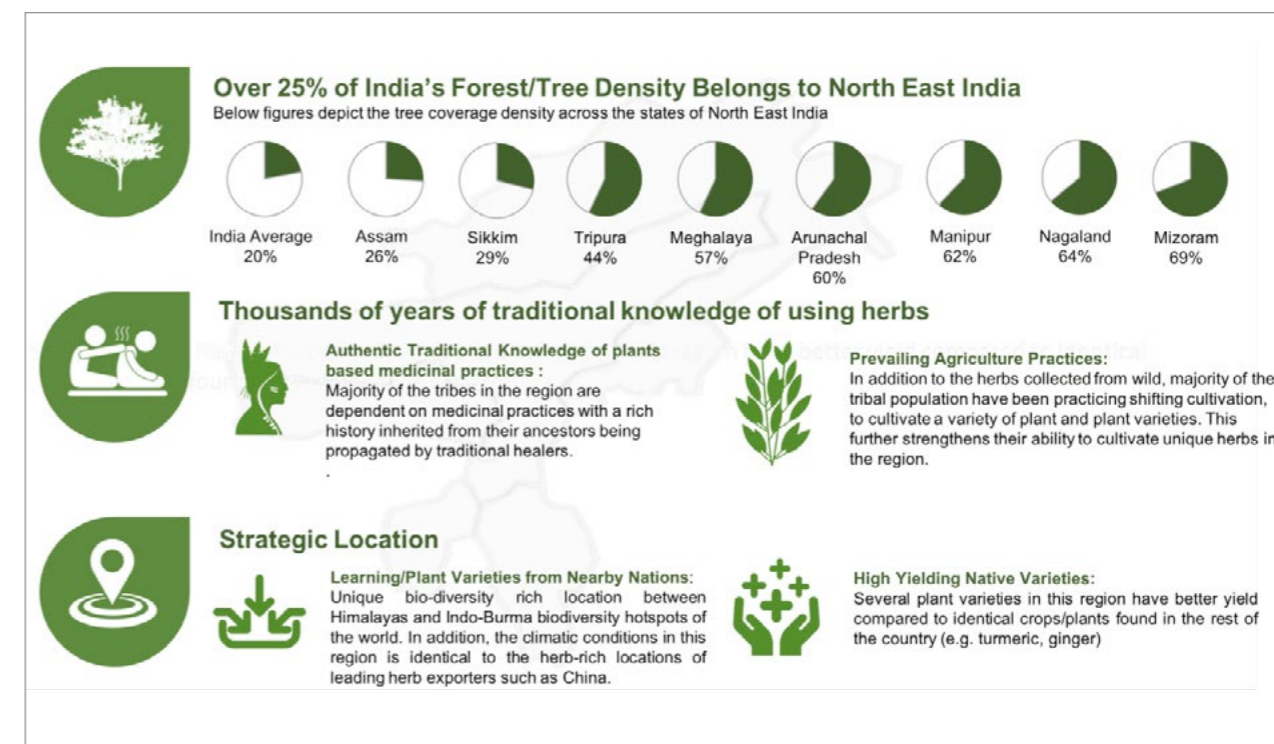
National Institute of Pharmaceutical Education and Research (NIPER) Guwahati is the fifth institute to be included in the list of the premium institutes under the Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Government of India. NIPER, Guwahati is the only national pharma education institute for the entire North Eastern Region of our country. NIPER-Guwahati started functioning from the month of September, 2008 to provide high quality pharma education and research with focus on exploitation of natural and synthetic products of the region for drug discovery and development.

About National Centres

NIPER Guwahati has 8 National Centres established with the funding from different sources which will integrate with the drug discovery and drug delivery from synthetic as well as natural resources. Northeast being a resource rich region has the ability to provide abundant and unique raw materials for exports of herbs as well as value added products and create a sustainable export model. Majority of the tribes have been using herbs for medicinal and other purpose since several generations and the same can be used for generating more products in future after scientific validation.

The TIES (Trade Infrastructure for Export Scheme) is a major initiative by the Ministry of Commerce, Government of India in enhancing India's export competitiveness. NIPER Guwahati proposes to establish the infrastructure facilities in the resource rich Northeast region that will help the companies and entrepreneurs of the region to increase their exports.

Why GMP Quality Testing centre is required??



Faculties of NIPER-Guwahati addressing tribal participants about skill development programme and proceeding with technical sections.

Strength of the Institute:

1. For conducting health camps and skill development programs, efficient volunteers are engaged who are trained at field work.
2. Sophisticated instrumental facilities are available at the various departments, accessible to students participating in the skill development programs.

Beneficiary:

- Tribal Students
- Tribal Population

Contact details

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NIPER Guwahati, Changsari, Silakatur, Guwahati, Assam, India

Vision

To enhance the quality and provide value addition of the herbal materials from NE and other regions

Mission

To support companies and entrepreneurs in the production and packaging of value-added formulated products and testing the raw material and finished product to deliver quality products for export purpose.

Objectives

The objective of the center is to enhance export competitiveness by bridging gaps in export infrastructure, creating focused export infrastructure and first-mile and last-mile connectivity for export of value-added herbal products and addressing quality and certification measures.

Expected outcomes

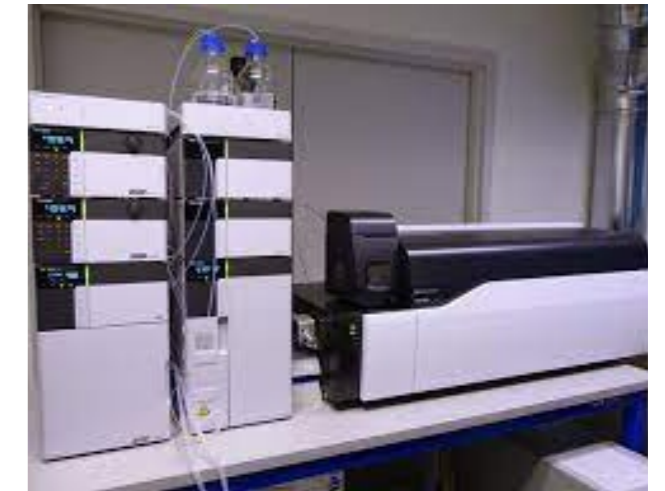
- Quality processes from herb cultivation, harvesting, processing and packaging
- Testing of raw materials, herbal extracts and developed formulations
- To produce quality herbal extracts and formulation
- Development of dosage forms like capsule, tablets, syrup etc. for consumption and export
- To generate revenue to be self-sustainable.

Facilities available / would be created

1. The facility will be built as per the current Good Manufacturing Practices required for production and packaging of value-added formulated products for consumption such as capsules, tablets, liquid syrups etc.
2. The formulation unit will have a small/pilot scale capacity to produce 30,000 tablets & capsules per hour.
3. Quality Assurance and Quality Control lab is the combination of quality assurance (QA), the process or set of processes used to measure and assure the quality of a product, and quality control (QC), the process of ensuring products and services meet consumer expectations.



QC laboratory



LC MS



Zeta sizer



HPLC



Gas chromatography



HPTLC



Tablet compression machine



Rapid Mixer Granulator



Fluid Bed Granulator



Tablet coating machine



Blister packing machine

Beneficiary of the facility

- The Quality control and Quality Assessment lab will provide support to companies and entrepreneurs in testing of raw materials, herbal extracts and formulations before packaging as per the export standards.
- The formulation and packaging unit will provide support to companies and entrepreneurs in the production and packaging of value-added formulated products for consumption and export.
- Training and skill set to the pharmacy students, smaller companies and entrepreneurs for using the proposed facilities.
- Support the pharmaceutical industries with respect to execute the scale-up activities, manufacturing & technology transfer of oral solid and liquid formulations.

What support NIPERG can provide

NIPER Guwahati proposes Northeast Plant Resources Quality Assessment and Value Addition Centre "NEPRE - QAVAC". The proposed Centre will include following units:

- Quality Control and Quality Assessment Lab
- Extraction Unit (GMP)
- Formulation & Packaging Unit (GMP).

Under TIES Centre two units are proposed to be built, first Quality Control and Quality Assessment Lab and second is Formulation and Packaging (GMP) unit.

Apart from the above-mentioned units NIPER G also provides support in terms of

- Training and hand-holding of local farmers.
- Knowledge sharing through our faculty
- GMP facility
- Incubation support and training

What support can be provided by the external agencies like banks / Institutes of higher learning / Govts. / Industry / NGOs etc.

The external agencies like bank, Governments and NGOs can provide financial support to startups, small scale industries and entrepreneur so that they can use the facility created at NIPER Guwahati. It will help in generating revenue to the center which will help to be self sustainable. Industries can support by executing the scale-up activities, manufacturing and technology transfer utilizing the facility. Institutes of higher learning who is working in the area of herbal extract and formulations they can support the centre by their technical expertise.

Contact details

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Advance Centre for Computer-aided Drug Design



About NIPER - Guwahati

National Institute of Pharmaceutical Education and Research (NIPER) Guwahati is the fifth institute to be included in the list of the premium institutes under the Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Government of India. NIPER, Guwahati is the only national pharma education institute for the entire North Eastern Region of our country. NIPER-Guwahati started functioning from the month of September, 2008 to provide high quality pharma education and research with focus on exploitation of natural and synthetic products of the region for drug discovery and development.

About National Centres

NIPER Guwahati has 8 National Centres established with the funding from different sources which will integrate with the drug discovery and drug delivery from synthetic as well as natural resources. GMP accredited Pilot Scale Extraction facilities was established with the objective to develop Herbal or Phytopharmaceutical products from the Medicinal Plants of North Eastern India and is funded by Dept. of Biotechnology (DBT), Govt. of India. It is further integrated with Quality Assessment & Value Addition Centre for the herbal industry in the North Eastern States of India, by Ministry of Commerce, Govt. of India under TIES Programme.

Why ACAD facility is required??

Advanced Centre for Computer-Aided Drug Design (ACAD) has been developed for addressing the specific North-Eastern drug design requirements for unique disease burden of the region. ACAD hosts the state-of-the-art drug design, machine learning (ML) and Artificial Intelligence (AI) infra-structure and expertise. It will facilitate and promote collaborative research between pharmacologists, chemists, biologists, biophysicists, structural biologists, medicinal chemists, and computational scientists. This center will also assist to discover/find new lead molecules with the potential to be developed into novel therapeutics against various diseases. The aim is to develop a robust computational model and drug discovery pipeline which will be able to predict the hits from large chemical space.

Vision and Mission

- Establishment of Advanced Center for Computer-Aided Drug Design (ACAD) for the discovery of novel leads specifically targeted for North-eastern disease.
- Empower the next-generation of medicinal chemists and drug discovery scientists to address unmet and urgent needs of the region.
- Develop regional, national and international collaborations to provide greater outreach to students and faculty.

Objectives of the centre

- To perform a through datamining on several type of cancer with a major focus on breast and oral cancer. A focused database with a dedicated GUI to predict protein activity for unknown molecules will be created. The database and GUI will be open freely for academic research use.
- To facilitate and promote collaborative research between pharmacologists, chemists, biologists, biophysicists, structural biologists, traditional medicinal chemists, and computational scientists.
- The pipeline and methodology developed will be further extended for other targets related to oral cancer, tropical diseases like cerebral malaria prevalent in North-East and infective diseases.

Expected outcomes

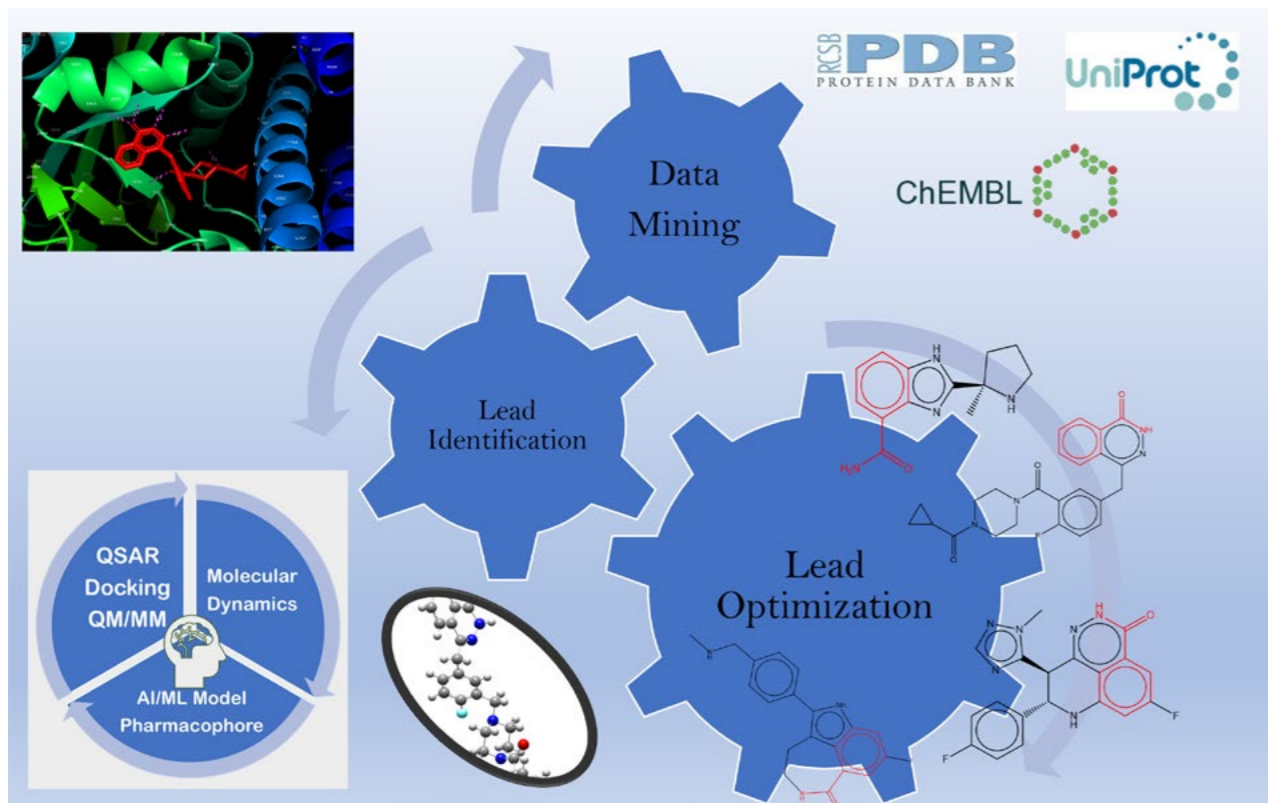
- Many students, researchers and young faculties will be trained throughout the North-East region in particular and country in general through workshops and visits.
- In addition, we will train international students and researchers in the area of molecular modelling.

Facilities available / would be created

NIPER Guwahati under this centre is planning to establish the following

1. Supercomputing facility capable of conducting state-of-the-art molecular modelling, dynamics, and drug design simulations.
2. It consists of a Master node to manage the supercomputing resources and give controlled access to authorized users.
3. CPU node to run virtual screening and quantum chemical calculations.
4. GPU node for running large-scale MD simulations.
5. A modern computer centre for student training and conducting workshops.

Overview of Drug Design for Cancer Treatment



Beneficiary of the facility

- Students and Faculty of NIPER and North-Eastern Universities.
- Drug Discovery Start-ups.
- Drug discovery and development scientists and groups.

What support NIPER-G can provide

Apart from the infra structure facilities, NIPER-G can provide mentor ship with respect to scientific knowledge required for the drug design, machine learning, AI and chemoinformatics based on the expertise available.

Contact details

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Dr. Hemant Srivastava, Coordinator

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vaibhav@niperguwahati.ac.in

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NIPER Guwahati, Changsari, Silakatmur, Guwahati, Assam, India.

MoUs

S. N.	Signed MoUs	Signing Date
1.	Daicel Chiral Technologies, Hyderabad	01st December, 2020
2.	AMTZ-Vizag, Visakhapatnam, Andhra Pradesh	06th October, 2020
3.	KIIT-TBI Incubator Centre, Bhubaneswar, Odisha	19th August, 2020
4.	National Dope Testing laboratory (NDTL), New Delhi.	17th July, 2020
5.	Central Council of Homeopathy (CCH), Guwahati	17th June, 2020
6.	Hindustan Antibiotics Limited (HAL), Pune, Maharashtra.	20th May 2020



GOVT. OF INDIA RECOGNIZED NATIONAL CENTRES

Sl. No.	Name of the National Centre's	Centre PI	Centre Coordinator's	Funding Agency & Sanctioned Duration
1	North-Eastern Societal aspect for Translational (NEST) Phyto-pharmaceutical/Herbal Research Incubation Centre.	Dr. USN Murty	Dr Amit Alexandar	BioNEST Scheme, BIRAC, DBT, Gol. (2019-22)
2	National Centre for Pharmaco-engineering (State-of-the-art-facility)		Dr Subham Banerjee	DPRP Scheme, DST, Gol. (2019-22)
3	Centre of Excellence to study and access the knowledge of traditional healthcare practices and traditional medicines used in tribal population and revitalizing by scientific validation.		Dr Ramu Adela	Min. of Tribal Affairs, Gol. (2019-22)
4	QA & Value addition Centre for Herbal Industry in the North Eastern states of India		Dr Radhakrishnanand	TIES Scheme, Min. of Commerce, Gol (2019-22)
5	Establishment of GMP accredited Pilot Scale extraction facilities for development of phyto-pharmaceutical products from the Medicinal Plants of NE India		Dr VGM Naidu	DBT, Gol (2021-24)
6	Adverse Drug Reaction Monitoring Centre		Dr Krishna Undela & Dr. Ramu Adela	NCC-PvPI, MoHFW, Gol (2021-24)
7	Advanced Centre For Computer-aided Drug Design (ACAD)		Dr. Hemant Srivastava	MeiTY, Gol (2021-24)
8	Animal Breeding Centre & GLP-accredited Biological Screening & Toxicology Centre.		Dr VGM Naidu	Min. of DoNER, Gol. (2021-24)

FUNDED EXTRA-MURAL RESEARCH PROJECTS

Project Title	Principal Investigators	Funding Agency	Funding Amount	Duration
National Mission on Himalayan Studies	Dr. USN Murty	MoEF	127.44 Lakh	2018-19 to 2021-22
Systematic and Scientific investigation of selected medicinal plants from north eastern part of India for rheumatoid arthritis and derivation of mechanism of action using bio guided fractionation methods besides identification and characterization of lead molecules using liquid-liquid separation technique	Dr. USN Murty	DBT-NE	50.73 Lakh	2018-19 to 2021-22
Hit to lead optimization of Novel Triazine analogues as potential autophagy modulators for the prevention of cancer	Dr. VGM Naidu	DBT	57.23 Lakh	2018-19 to 2021-22
Development of novel liquid-retentive and reconstitutable solid-dry powder topical formulations containing oil-in-water nanosized cationic emulsions loaded with or without cyclosporine A to manage the moderate to severe dry eye syndrome	Dr. S. Tamilvanan	DBT	34.38 Lakh	2018-19 to 2021-22
Exploration of drug development for psychological stress mediated IBD, Cancer & Malaria from the Indigenous medicinal plants of NE- India	Dr. USN Murty	DRDO	41.65 Lakh	2018-19 to 2021-22
To study and access the knowledge of traditional healthcare practices and traditional medicines used in tribal population and revitalizing by scientific validation	Dr. USN Murty	MoTA	40 Lakh	2018-19 to 2020-21
Establishment of National Center of Pharmacoengineering for designing innovative delivery strategies to fight neglected diseases.	Dr. USN Murty	DST	493.88 Lakh	2019-20 to 2022-23
Establishment of a cell-permeant recombinant toolbox for the conversion of adult human somatic cells to insulin producing Beta-cells	Dr. Ranadeep Gogoi	NECBH	15.99 Lakh	2019-20 to 2021-22
Bioengineered bilayer 3D printlets for segregated compartmental delivery of fixed dose anti-tubercular drug combination	Dr. Subham Banerjee	NECBH	11.90 Lakh	2019-20 to 2021-22
Evaluation of therapeutic potential of natural /synthetic molecules and development of non-invasive diagnostic translational approach in air pollution-induced airway disease: Focus on EMT Signalling pathway	Dr. VGM Naidu	NECBH	15.00 Lakh	2019-20 to 2021-22
North-Eastern Societal aspect for Translational (NEST) Phytopharmaceutical/Herbal Research Incubation centre	Dr. USN Murty	BIRAC	238.60 Lakh	2019-20 to 2022-23
Developing a public health informatics platform in India for a systems view of health & diseases under epidemiology data analytics (EDA) of interdisciplinary cyber physical systems (ICPS) programme	Dr. USN Murty	DST	175 Lakh	2019-20 to 2022-23
Pharmacoengineered lipid core-shell nanoarchitectonics to enhance macrophages uptake for potential translational therapeutic outcome	Dr. Subham Banerjee	DST-SERB	34.70 Lakh	2019-20 to 2022-23
Medicated skin patch to mitigate destructive pulmonary tuberculosis in six districts of Assam	Dr. Subham Banerjee	DST-ASTEC	2.9 Lakh	2019-20 to 2021-22

Project Title	Principal Investigators	Funding Agency	Funding Amount	Duration
Integrated information system to interpret, integrate and mitigation of cardio metabolic health care in North East tribes of Assam and Mizoram	Dr. USN Murty	ICMR	70 Lakh	2019-20 to 2022-23
Quality Assessment and value addition centre for herbal industry in the North Eastern states of India.	Dr. USN Murty	MoC	2262 Lakh	2019-20 to 2022-23
Development of Targeted Gut Lymphangiogenesis nanomedicine for treatment of Liver Cirrhosis	Dr. Subham Banerjee	DST	50.25 Lakh	2019-20 to 2022-23
Establishment of Animal Breeding and GLP accredited biological screening and toxicology centre for herbal medicines of NE region	Dr. USN Murty	NEC	1200 Lakh	2020-21 to 2023-24
Ramanujan Fellowship to Dr. Hemanth Srivastava at IIT Guwahati.	Dr. Hemanth Srivastava	SERB	89.00 Lakh	2016-17 to 2021-22
Identify the DNA adduct and associated metabolic alteration in upper aerodigestive tract cancer with smokeless tobacco chewers in the Northeast Region of India: A Metabolomics Approach	Dr. Roshan Borkar	SERB	37.36 Lakh	2020-21 to 2023-24
Ramalingswami re-entry fellowship of the dept of biotechnology for the year 18-19	Dr. Purusottam Mahapatra	DBT	113.60 Lakh	2018-19 to 2023-24
To Evaluate the effect of herbal extract on carbon tetrachloride induced hepatotoxicity in rats, alloxan induced type 1 diabetes and in vitro anti cancer activity on human cancer cell lines	Dr. Bidya Dhar Sahu	ADTU	2.975 Lakh	2020-21
Characterization of high value phytochemicals of anti diabetic and immunomodulatory properties in north eastern banana varieties	Dr. Sanjay Banerjee	THSTI	4.99 Lakh	2020-21
Generation of 3D printed multi functional customized drug delivery systems: in vitro and in vivo evaluation.	Dr. Subham Banerjee	ICMR	24.27 Lakh	2020-21 to 2022-23
Establishment of GMP accredited pilot scale extraction facilities for development of phytopharmaceutical products from the medicinal plants of NE India.	Dr. USN Murty	DBT	663.50 Lakh	2020-21 to 2023-24
Identification of epigenetic control mechanisms of withaferin A dependent ferroptosis to overcome therapy resistant in multiple myeloma.	Dr. Naresh Kumar	DBT	113.60	2020-21 to 2025-26
Development of computational protocols for designing inhibitors using PARP-1 as a model and synthesis & biological evaluation of designed inhibitors	Dr. Hemanth Srivastava	MEITY	166.81 Lakh	2020-21 to 2023-24
Understanding the relationship between metabolic stress and acquired tamoxifen resistance in breast cancer cells	Dr. S. Sudhagar	ICMR	18.89 Lakh	2020-21 to 2023-24
Evaluating the therapeutic effect of Musa balbisiana fruit powder on non alcoholic fatty liver disease in rats.	Dr. Sanjay Banerjee	ICMR	18.8 Lakh	2020-21 to 2023-24
Finding the mechanistic link between the progression of Non-alcoholic fatty liver disease and cardiac complication	Dr. Sanjay Banerjee	ICMR	Current year release Rs. 4.99 Lakh, total project cost to be collected from PI	2019-20 to 2021-22
Synthesis and characterization of standards of certain drugs and their metabolites	Dr. USN Murty	NDTL	110 Lakhs	01.08.2020 to 31.07.2023
Deep learning assessment for identification of novel diagnostic and prognostic biomarkers for prediction of diabetic retinopathy in northeast population	Dr. Ramu Adela	ICMR	45 Lakhs	2020-2023

Intellectual Property Rights (IPRs)

Design Patent:

- Tushar Kanti Malakar, VGM Naidu, Subham Banerjee, USN Murty. "A face protecting device" Application No. 329319-001. Cbr No. 8169, Date of Grant: 14 January 2021.

Patent Granted:

- Tamilvanan Shunmugaperumal, Methods to prepare cinnarizine (CNZ)- β cyclodextrin (β CD) complexes and determine the polymers influence on enhancing the CNZ solubility. Application no: 201831025294 A. Patent no. 344868, Date of Grant: 24 August 2020.
- Subham Banerjee, Vishal Sharad Chaudhari, Tushar Kanti Malakar, USN Murty. "Medicated skin patch, use and method of making thereof." Application No. 202031018293. Patent Number: 355267. Date of Grant: 05 January 2021.

Patent Filed:

- Savneet Kaur, Dinesh M Tripathi, VGM Naidu, Subham Banerjee. Nanoengineered VEGF-C Molecule Formulation for Cirrhosis and Portal Hypertension. Application No. 202011049544. Date of Filing: 12 November, 2020.
- Savneet Kaur, Dinesh M Tripathi, VGM Naidu, Subham Banerjee. Nanoengineered VEGF-C Molecule Formulation for Cirrhosis and Portal Hypertension. Application No. 202011049544. Date of Filing: 12 November, 2020.
- Nishant Jain, Padma Satish, VGM Naidu, Rohit K Srivastava, self-assembled niclosamide-hyaluronic acid conjugate micelles for site-selective regression of tumor and tumor spheroids. Indian Patent Application No.: 202021038024. Dated 3rd September, 2020
- VGM Naidu, USN Murty, Eswara Rao Pupala, Deepak Bharadwaj PVP, Jagadeesh Kumar, Bishnu Prasad Sarma. Therapeutic formulations for the treatment and management of inflammatory bowel disease. Application No. 202031026089. Date of Filing: 20 June, 2020.
- Tushar Kanti Malakar, VGM Naidu, Subham Banerjee, USN Murty. A face protecting device. Application No. 202031020364. Date of Filing: 14 May, 2020.

Awards and Recognitions

- Institute Top 11 NIRF-2020 ranking under pharmacy category declared by Min. of Education, Govt. of India.
- Dr. Sanjay K Banerjee, Dr. VGM Naidu & Dr. Amit Alexander listed under World 2% Scientist Category in 2020 declared by Stanford University, US.
- Dr. Subham Banerjee, Asst. Professor, Dept. of Pharmaceutics, received NASI-Swarna Jayanti Puruskar-2020, National Academy of Sciences, Prayagraj (Allahabad).
- Dr. Subham Banerjee, Asst. Professor, Dept. of Pharmaceutics, Elected as Life Fellow of Indian Chemical Society (FICS)-2021, Kolkata, West Bengal.
- Dr. Subham Banerjee, Asst. Professor, Dept. of Pharmaceutics, received the Member of the Royal Society of Chemistry (MRSC)-2021, London, United Kingdom (UK).
- Dr. Subham Banerjee, Asst. Professor, Dept. of Pharmaceutics, received Associate Fellow of West Bengal Academy of Science & Technology (WAST)-2020.
- Dr. Subham Banerjee, Asst. Professor, Dept. of Pharmaceutics, inducted as Member of National Academy of Sciences (MNASc.)-2020, Prayagraj (Allahabad).

- Dr. Amit Alexander First Prize, East-Central Zone Dissolution Research Presentation India (DRPI) 2020-Online organized by Society of Pharmaceutical Dissolution Science (SPDS) in collaboration with Association of Pharmaceutical Teachers of India (APTI), held on 7th June 2020, for presenting research work under the title A Comparative Assessment of Dissolution Profile of Curcumin and Piperine from Nano-lipid carrier.
- Dr. Amit Alexander Young Researcher Award-2020 in PharmaVision 2k25 organized by Shri Balaji Book Distributors on September 27, 2020.
- Dr. Subham Banerjee, BRTC-Mapping the Changemakers of NER of India, First Prize (2020) BIRAC, DBT, Govt. of India.
- Dr. Subham Banerjee, NASI-Swarna Jayanti Puruskar-2020, National Academy of Sciences (NASI), Prayagraj (Allahabad), U.P.
- Dr. Subham Banerjee, Technology Award (2019-20), 12th Foundation Day of NIPER-Guwahati, Assam.
- Dr. Subham Banerjee, External Cash Flow Award (2019-20), 12th Foundation Day of NIPER-Guwahati, Assam.
- Dr. Sanjay K Banerjee is awarded Shri. Om Prakash Sharma Award instituted by Indian Academy of Biomedical Sciences for his outstanding contributions in Biomedical Research (2020).
- Dr. Sanjay K. Banerjee: Awarded "Biotechnology Ignition Grant (BIG)" in the year 2020 for development of Nutraceutical Product.
- Dr. Sanjay K Banerjee: Awarded by NIPER-Guwahati for securing top 2% world scientist rank reported by Stanford University, 2020.
- Dr. P. Mohapatra. Lindau Alumni Peer Reviewer for the 70th Lindau Nobel Laureate Meeting. 27 June-2 July 2021, Lindau, Germany. Reviewed 10 abstracts submitted by young scientist from several countries participating in the 70th Lindau meeting.
- Dr. Subham Banerjee became Life Fellow of Indian Chemical Society (FICS)-2021, ICS-Kolkata, West Bengal.
- Dr. Subham Banerjee became Member of the Royal Society of Chemistry (MRSC)-2021, RSC, London, United Kingdom (UK).
- Dr. Subham Banerjee became Member of National Academy of Sciences (MNASc.)-2020, NASI, Prayagraj (Allahabad), U.P., India.

Conference/symposia Presentations

- Datta Maroti Pawde and Dr. S. Tamilvanan. Assessing the in vitro drug release in simulated synovial fluid and cellular internalization in RAW 264.7 cell line with dual drug (chloroquine phosphate & flavopiridol)-loaded Janus nanosized emulsions, 19th international e-symposium on advances in technology and business potential of new drug delivery systems organized by Controlled Release Society Indian Local Chapter held on 25-29 February 2021, (e-poster presentation).
- Syed Nazrin Ruhina Rahman and Dr. S. Tamilvanan. Dual drug (cyclosporin A & etodolac)-loaded oil-and/or polymer-based nano-dispersions: comparative in vitro drug release studies, 19th international e-symposium on advances in technology and business potential of new drug delivery systems organized by Controlled Release Society Indian Local Chapter held on 25-29 February 2021, (e-poster presentation).
- Abhinab Goswami and Dr. S. Tamilvanan. Systematic optimization of-and in vitro drug release performance from-cinnarizine loaded oil-less nanosized emulsions for topical otic application, 19th international e-symposium on advances in technology and business potential of new drug delivery systems organized by Controlled Release Society Indian Local Chapter held on 25-29 February 2021, (e-poster presentation).
- Bhakti M Pawar, Shivakumar M Methri and Dr. S. Tamilvanan. Validation of UV Spectrophotometric Method to Determine Concurrently Etodolac and Ibuprofen in Combined Drug Solution and Individual Commercial Tablets by Applying Vierordt's Method, Global Trends in Pharmaceutical Sciences, organized and hosted by B. Pharmacy College Rampura-Kakanpur, Gujrat, India in collaboration with APP GUJRAT STATE BRANCH, APP AMERICAN INTERNATIONAL BRANCH, APP MOLPHARM DIVISION held on 28-29 December 2020, (Poster presentation).

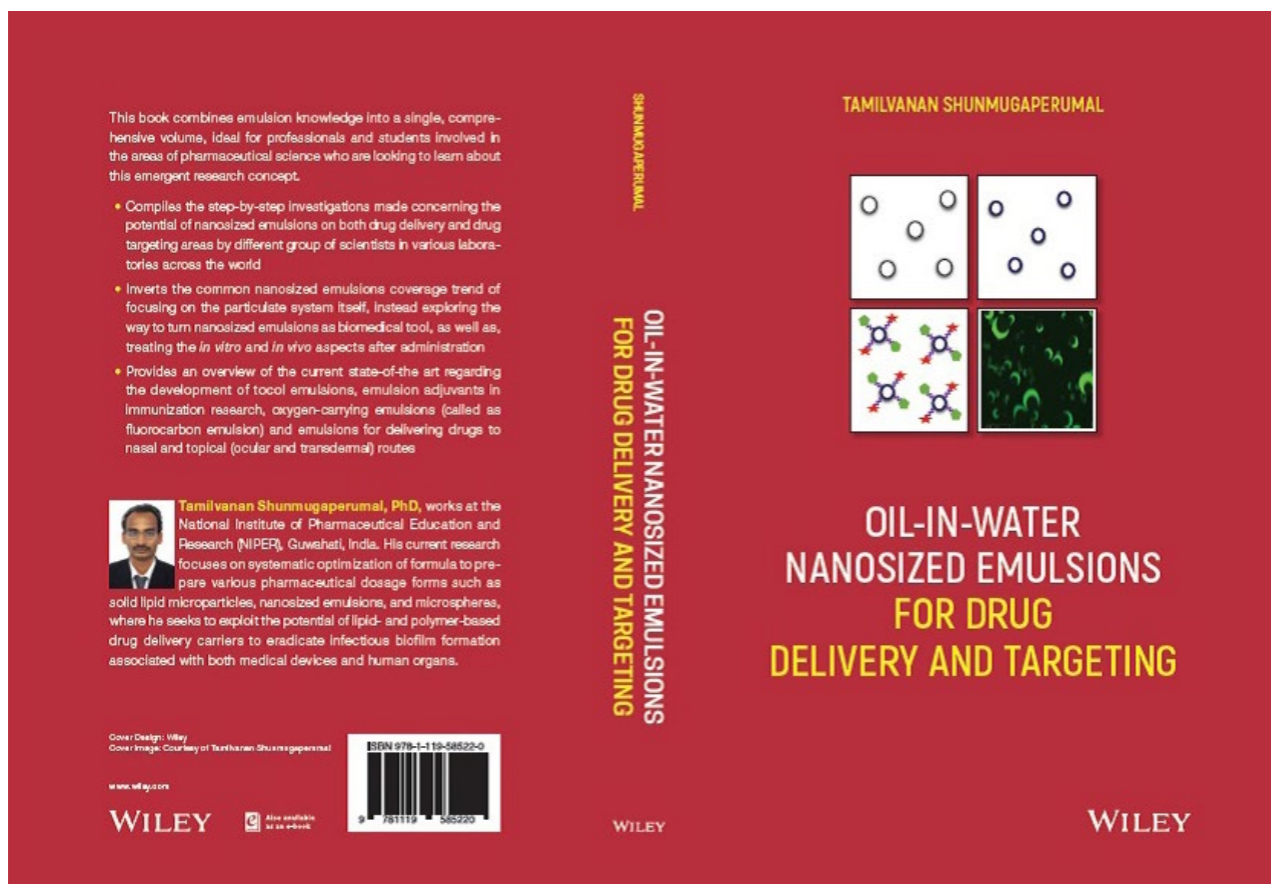
- Bhakti M Pawar, Shivakumar M Methri and Dr. S. Tamilvanan. Applying the Simultaneous Equation or Vierordt's Method for Concurrent Determination of Etodolac and Ibuprofen by the UV-Spectrophotometer in drug solution and marketed dosage forms, Technology-based Pharmacy Education, Practice and Industrial Training on Skill Development a national conference sponsored by Indian Pharmacy Graduate Association (IPGA) Alwar Local Chapter, organized by Alwar Pharmacy College, Alwar, Rajasthan, India held on 05th December 2020, (Poster presentation).
- Datta Maroti Pawde and Dr. S. Tamilvanan. In vitro release of chloroquine phosphate and flavopiridol from dual drug loaded Janus emulsions, Virtual Dissolution Discussion Group India meeting 2020 exclusively sponsored by Agilent, organized and hosted by Dissolution Discussion Group (DDG) held on 15-16 October 2020, (e-poster presentation).
- Oly Katari and S. Tamilvanan. Formulation and evaluation of Janus nanocapsules and Janus nanosized emulsions loaded with cyclosporin A and etodolac. Student's Pharmaceutical Conclave, Organized by Pharmacist Society of Kerala in association with Kerala Private Pharmacists Association, 21st August 2020.
- Syed Nazrin Ruhina Rahman and Dr. S. Tamilvanan. Studies on in vitro drug release behavior of non-phospholipid-based topical ophthalmic emulsions containing 0.05 or 0.1 % w/w cyclosporin A (CsA), Virtual Dissolution Discussion Group India meeting 2020 exclusively sponsored by Agilent, organized and hosted by Dissolution Discussion Group (DDG) held on 15-16 October 2020, (e-poster presentation).
- Syed Nazrin Ruhina Rahman and Dr. S. Tamilvanan. In vitro drug release behavior of non-phospholipid-based topical ophthalmic emulsions containing 0.05 or 0.1 % w/w cyclosporin A (CsA) for dry-eye syndrome management, Disso Research Presentations India (DRPI) 2020 Online, organized by Society for Pharmaceutical Dissolution Science (SPDS) in collaboration with Association of Pharmaceutical Teachers of India (APTI) held on 4 June 2020, (oral research presentation).
- Oly Katari and S. Tamilvanan. Comparative in vitro drug(s) release studies between Janus nanocapsules and Janus nanosized emulsions loaded with cyclosporin A and etodolac, Disso Research Presentations India (DRPI) 2020 Online, organized by Society for Pharmaceutical Dissolution Science (SPDS) in collaboration with Association of Pharmaceutical Teachers of India (APTI) held on 4 June 2020, (oral research presentation).
- East-Central Zone Dissolution Research Presentation India (DRPI) 2020-Online organized by Society of Pharmaceutical Dissolution Science (SPDS) in collaboration with Association of Pharmaceutical Teachers of India (APTI), held on 7th June 2020, for presenting research work under the title A Comparative Assessment of Dissolution Profile of Curcumin and Piperine from Nano-lipid carrier.
- Participated in PPDS sponsored 'National Seminar on Development of Biologics in India: Significance of Industry-Academia Collaboration, Regulatory Requirements, Challenges, Opportunities and Strategies' organized by National Institute of Pharmaceutical Education and Research-Guwahati from 21-22 January 2021.
- Participated in Mega Science Technology and Industry Expo at India International Science Festival (IISF)-2020 organized in virtual platform at Delhi by Ministry of Science and Technology, Ministry of Earth Science, Ministry of Ayush, and CSIR-India from 22nd to 25th December 2020.

Proceedings of National/international conferences

- S Jain, S Durugkar, P Saha, MS Eapen, P Sharma, V Naidu, SS Sohal. Azithromycin Alleviates Cigarette Smoke Induced Epithelial Mesenchymal Transition (EMT), Airway Inflammation and Enhances Antioxidant Mechanisms in COPD. B65. COPD PATHOGENESIS: CELL AND ANIMAL MODELS (American Thoracic Society), A4071-A4071 (2020).
- P Saha, S Jain, I Mukherjee, S Durugkar, M Das, S Gokhale, SS Sohal, V Naidu, P Sharma. Effect of Long-Term Particulate Matter (PM10) Exposure on Lung Pathophysiology in Mice. B26. HEALTH EFFECTS CAUSED BY AIR POLLUTION-FROM RNAseq TO POPULATION OUTCOMES (American Thoracic Society), A2887-A2887 (2020).

International Book

TAMILVANAN SHUNMUGAPERUMAL. Oil-in-Water Nanosized Emulsions for Drug Delivery and Targeting. John Wiley & Sons Publishers, Hoboken, New Jersey, USA, 10, January, 2021. ISBN-10: 1119585228; ISBN-13: 978-1119585220



Mentorship

- Dr. Amit Alexander and Dr. Pramod Kumar Mentored, CSIR-Summer Research Training Programme (SRTP)-2020 at CSIR- North East Institute of Science and Technology (NEIST), Jorhat, India. Proposed Area of Mentorship- Novel Drug Delivery System.

Organizing committee member of training program /conferences

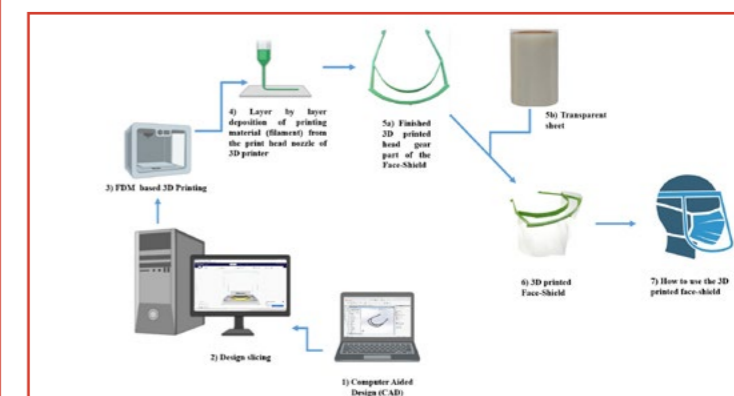
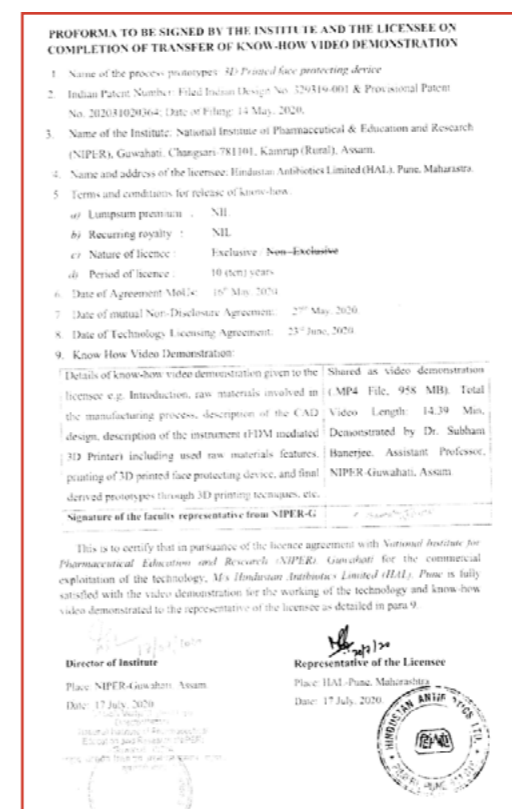
- Dr. Amit Alexander, Member, Assessment Committee Members for GCP Professionals Certification Scheme (GCPPCS), Clinical Development Services Agency (CDSA), Translational Health Science & Technology Institute (THSTI).
- Dr. Amit Alexander, Reviewer/Evaluator, Dissolution Research Presentation India (DRPI) 2020-Online organized by Society of Pharmaceutical Dissolution Science (SPDS) in collaboration with Association of Pharmaceutical Teachers of India (APTI), from 4-7 June 2020.

STUDENT AWARDS

- Mrs. Oly Katari, PG Scholar, Dept. of Pharmaceutics, research work selected for 2nd prize from DRPI-2020, Society for Pharmaceutical Dissolution Sciences.
- Mrs. Nandini, PG Scholar, Dept. of Pharmacy Practice received consolation prize from Indian Congress of Pharmacy Practice 2020.
- Mr. Vishal Choudhury, Ph.D. Scholar, Dept. of Pharmaceutics, bagged Best Poster Award (2020), Dissolution Discussion Meeting, Agilent Technologies, USA.
- Mr. Datta M. Pawde, Ph.D. Scholar, Dept. of Pharmaceutics, received appreciation prize (2020), Dissolution Discussion Meeting, Agilent Technologies, USA.
- Ms. Ruhina Rahman, Ph.D. Scholar, Dept. of Pharmaceutics, received appreciation prize (2020), Dissolution Discussion Meeting, Agilent Technologies, USA.
- Mr. Maharshi Thalla, Ph.D. Scholar, Dept. of Pharmaceutics, research work got selected as Front Cover Page (2020) ASSAY & Drug Dev. Tech., Mary Ann Liebert Inc., New York, USA.
- Mr. Maharshi Thalla, Ph.D. Scholar, Dept. of Pharmaceutics, received Best JRF Award-2020-21, 13th Foundation Day of NIPER-Guwahati, Assam.
- Mr. Dinesh Choudhury, Ph.D. Scholar, Dept. of Pharmaceutics, research work selected for 3rd Prize by Controlled Release Society International Symposium (2021), CRS-I C, Mumbai, India.

Technology Transferred

Design granted & patented "A face protecting device" signed for the mutual non-disclosure agreement, & technology is transferred to Hindustan Antibiotics Limited (HAL, a Govt. of India Enterprise under Ministry of Chemicals and Fertilizers, Govt. of India), Pimpri, Pune, Maharashtra.



Peer-Reviewed International Publications

- Abhinab Goswami, Rajappa Margret Chandira, Tamilvanan Shunmugaperumal, Neoteric solvents for the pharmaceutical industry: an update, *Drug Discovery Today*, In Press, 2021, [Impact factor in 2020 is 7.851] ISSN 1359-6446, <https://doi.org/10.1016/j.drudis.2021.03.005>
- Pawar BM, Rahman SNR, Pawde DM, Goswami A, Shunmugaperumal T. Orally Administered Drug Solubility-Enhancing Formulations: Lesson Learnt from Optimum Solubility-Permeability Balance. *AAPS PharmSciTech*. 2021 Feb 2;22(2):63. [Impact factor in 2020 is 3.246] ISSN 1530-9932 (Online) doi: 10.1208/s12249-021-01936-9. PMID: 33528698.
- Famta P, Famta M, Kaur J, Khursheed R, Kaur A, Khatik GL, Pawde DM, Rahman SNR, Shunmugaperumal Tamilvanan. Protecting the Normal Physiological Functions of Articular and Periarticular Structures by Aurum Nanoparticle-Based Formulations: an Up-to-Date Insight. *AAPS PharmSciTech*. 2020 21(3):95. [Impact factor in 2020 is 3.246] ISSN 1530-9932 (Online) doi: 10.1208/s12249-020-1636-0. PMID: 32096106
- T. Raja Sekharan, R. Margret Chandira, S.C. Rajesh, Shunmugaperumal Tamilvanan, CT. Vijayakumar, B.S. Venkateswarlu. pH, Viscosity of Hydrophobic Based Natural Deep Eutectic Solvents and the Effect of Curcumin Solubility in it. *Biointerface Research in Applied Chemistry*. 2021; 11(6); 14620-14633.
- Mukta Agrawal, Shailendra Saraf, Swarnlata Saraf, Sunil K Dubey, Anu Puri, Umesh Gupta, Prashant Kesharwani, V. Ravichandiran, Pramod Kumar, VGM Naidu, Upadhyayula Suryanarayana Murty, Ajazuddin, Amit Alexander*. Stimuli-responsive In situ gelling system for nose-to-brain drug delivery. *Journal of Controlled Release*. 2020; 327: 235-265 (Impact Factor: 9.776)
- Madhulika Pradhan, Amit Alexander, Manju Rawat Singh, Deependra Singh, Swarnlata Saraf, Shailendra Saraf, Krishna Yadav. Statistically optimized calcipotriol fused nanostructured lipid carriers for effectual topical treatment of psoriasis. *Journal of Drug Delivery Science and Technology*. 2021; 61: 102168. (Impact Factor: 3.981)
- Mukta Agrawal, Shailendra Saraf, Swarnlata Saraf, Upadhyayula Suryanarayana Murty, Sucheta Banerjee Kurundkar, Debjani Roy, Pankaj Joshi, Dhananjay Sable, Yogendra Kumar Choudhary, Prashant Kesharwani, Amit Alexander*. In-line treatments and clinical initiatives to fight against COVID-19 Outbreak. *Respiratory Medicine*. 2020. 106192 (ahead of print) (Impact Factor: 3.415).
- Siddhanth Hejmady, Rajesh Pradhan, Amit Alexander, Mukta Agrawal, Gautam Singhvi, Prashant Kesharwani, Sunil K Dubey. Recent advances in targeted nanomedicine as promising antitumor therapeutics. *Drug Discovery Today*. 2020; 25(12): 2227-2244. (Impact Factor: 7.851)
- Pavan Kumar Samudrala, Pramod Kumar, Kamlesh Choudhary, Nagender Thakur, Gaurav Suresh Wadekar, Richa Dayaramani, Mukta Agrawal, Amit Alexander. Virology, pathogenesis, diagnosis and in-line treatment of COVID-19. *European Journal of Pharmacology*. 2020; 883: 173375. (Impact Factor: 4.432)
- Mehak Rastogi, Ranendra Nath Saha, Amit Alexander, Gautam Singhvi, Anu Puri, Sunil Kumar Dubey. Role of Stealth Lipids in Nanomedicine-based drug carriers. *Chemistry and Physics of Lipids*. 2020; 235: 105036. (Impact Factor: 3.329)
- Vishal Sharad Chaudhari, Tushar Kanti Malakar, USN Murty, Subham Banerjee*. Extruded filaments derived 3D Printed Medicated Skin Patch to Mitigate Destructive Pulmonary Tuberculosis: Design to delivery. *Expert Opinion on Drug Delivery*. 18(2), 301-313, 2021. (IF-6.64)
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- Kamal Kant, Ravi Rawat, Vipin Bhati, Shailesh Bhosale, Dalchand Sharma, Subham Banerjee*, Anoop Kumar. Computational Identification of Natural Products Leads that Inhibit Mast Cell Chymase: An Exclusive Plausible Treatment for Japanese Encephalitis. *Journal of Biomolecular Structure & Dynamics*. 39(4), 1203-1212, 2021. (IF-3.22)
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- Vishal Sharad Chaudhari, USN Murty, Subham Banerjee*. Lipidic nanomaterials to deliver natural compounds against cancer: a review. *Environmental Chemistry Letters*, 18(6), 1803-1812. 2020. (IF-9.02)
- Maharshi Thalla, Kamal Kant, Dalchand Sharma, Ravi Rawat, Subham Banerjee*. Merged experimental guided computational strategy toward tuberculosis treatment mediated by alveolar macrophage mannose receptor. *Journal of Biomolecular Structure & Dynamics*. 38(17): 5195-5203, 2020. (IF-3.22)
- Maharshi Thalla, Jagdeesh Kumar Gangasani, Pritam Saha, Srikanth Ponneganti, Roshan M Borkar, VGM Naidu, USN Murty, Subham Banerjee*. Synthesis, characterizations, and use of O-stearyl mannose (OSM) ligand- engineered lipid nanoarchitectonics for alveolar macrophages targeting. *VSI: Drug Delivery Research, ASSAY & Drug Development Technologies*. 18(6): 249-260, 2020. (IF-1.73)
- Vishal Chaudhari, Roshan M Borakar, USN Murty, Subham Banerjee*. Analytical method development & validation of reverse-phase high-performance liquid chromatography (RP-HPLC) method for simultaneous quantifications of quercetin and piperine in dual-drug loaded nanostructured lipid carriers. *Journal of Pharmaceutical & Biomedical Analysis*. 186 (C): 113325, 2020. (IF-3.93)
- Sayantana Pandit, Subhadeep Roy, Jonathan Pillai, Subham Banerjee*. Formulation and intracellular trafficking of lipid-drug conjugate nanoparticles containing hydrophilic antitubercular drug for improved intracellular delivery to human macrophages. *ACS Omega*. 5(9): 4433-4448. 2020. (IF-3.51)
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- Poulomi Dey, Eswara Rao Puppala, Vegi Ganga Modi Naidu, Gopal Das, Aiyagari Ramesh. Multifunctional Synthetic Amphiphile for Niche Therapeutic Applications: Mitigation of MRSA Biofilms and Potential in Wound Healing. *ACS Applied BioMaterials*, 3, 8830-8840 (2020).

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 - Khaja Moinuddin Shaik, Bhaskar Sarmah, Gaurav Suresh Wadekar, Pramod Kumar, Regulatory updates and analytical methodologies for nitrosamine impurities detection in sartans, ranitidine, nizatidine, and metformin along with sample preparation techniques, in press, 2020, <https://doi.org/10.1080/10408347.2020.1788375>. *Critical Reviews in Analytical Chemistry*, ISSN: 0014-2999 [Impact factor 6.657]
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Progress of Permanent Campus Construction

Name of the Project	Construction of campus for National Institute of Pharmaceutical Education & Research (NIPER), Guwahati, Assam
Project Value	159.69 Crore
Project Management Consultant	Engineering Projects (India) Ltd. (A Government of India Enterprise)
Architect	M/s Prasad Associates, Hyderabad
Contractor	M/s NCC Limited, Hyderabad
Actual Date of Start of Work	20.07.2015
Overall Physical Progress in %	76.80 % (as on 31-03-2021)
Overall Financial Progress	120.33 crores

Progress of Permanent Campus Construction

Sl. No.	Name of Building	Physical Progress (%)	Remarks
1	Academic Block H : PROV: G+3 Storied	99.10%	Work in Progress
2	Academic Block B : PROV: G+3 Storied	95.30%	Work in Progress
3	Academic Block C : PROV: G+3 Storied	96.40%	Work in Progress
4	Girls Hostel : PROV: G+3 Storied	100.00%	Completed & Handed over to NIPER-G
5	Dining Block (Girls Hostel) : PROV: G Storied	100.00%	Completed & Handed over to NIPER-G
6	Boys Hostel : PROV: G+3 Storied	52.50%	Work in Progress
7	Dining Block (Boys Hostel): PROV: G Storied	91.00%	Work in Progress
8	Type III Qtr : PROV : G+4 Storied	100%	Completed & Handed over to NIPER-G
9	Type IV Qtr : PROV : G+3 Storied	98.00%	Work in Progress
10	Recreation Facilities: PROV : G+1 Storied	55.00%	Work in Progress
11	Director Bunglow : PROV : G+1 Storied	2.00%	Work in Progress
12	Type II Qtr : PROV : G+3 Storied	5.00%	Work in hold
13	Administrative Building : PROV : G+1 Storied	5.00%	Work in hold
14	Type V Qtr : PROV : G+1 Storied	3.00%	Work in hold
15	Animal House : PROV : G+1 Storied	21.00%	Work in progress
16	Allied Development Works (Road, Drain, External Electrical etc.,)	85.00%	Work in progress
17	Water Supply System	87.00%	Work in progress
18	Water Body	95.00%	Work in progress
17	Academic Connecting Corridor	80.00%	Work in progress
18	Approach Road from NH-27 to Main Gate	23.00%	Work in progress
19	Approach Road from Main Gate to Circle-01	22.50%	Work in progress
20	Shifting of Cremation Ground	88.00%	Work in progress
21	TIES Building : PROV : G+1 Storied	1.00%	Work in progress

Annual Statement of Accounts for the F.Y. 2020-21





Director's Report (2020-21)

Gentlemen,

It is my privilege to present Audited Statement of Accounts of National Institute of Pharmaceutical Education & Research (NIPER), Guwahati for the year ending March, 2021.

Grant-in Aid:

The Institute received a Grant-in-aid of Rs. 7945.00 Lakhs (Rs. 1445.00 Lakh for Recurring expenses and Rs. 6500.00 Lakh for Capital expenses) from Ministry of Chemicals & Fertilizers, Govt. of India for the year ending March, 2021.

Staff:

Faculty : 15
 Technical Staff : 08
 Administrative Staff : 19
 MTS : 13

Acknowledgement:

I sincerely thank the Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers, Govt. of India for their full support and cooperation.

For and on behalf of NIPER, Guwahati

(USN Murty)
 Director, NIPER Guwahati

National Institute of Pharmaceutical Education & Research : Guwahati

BALANCE SHEET as at 31st March 2021

(Amount in ₹)

Corpus/ Capital Fund and Liabilities	Schedule	Current Year	Previous Year
Corpus/Capital Fund	1	87,15,63,593.00	35,06,09,989.00
Reserves and Surplus	2	-	-
Endowment Funds	3	1,27,35,55,293.00	1,20,11,46,548.00
Secured Loans and Borrowings	4	-	-
Unsecured Loans and Borrowings	5	1,000.00	1,000.00
Deferred Credit Liabilities	6	-	-
Current Liabilities and Provisions	7	29,39,02,627.00	4,25,53,179.00
TOTAL		2,43,90,22,513.00	1,59,43,10,716.00
ASSETS			
Fixed assets	8	1,46,30,67,899.00	1,36,57,14,450.00
Investments -earmarked/endowment funds	9		
Investment -others	10		
Current Assets, Loans and Advances, etc.	11	97,59,54,614.00	22,85,96,266.00
Miscellaneous expenditure (to the extent not written off or adjusted)			
TOTAL		2,43,90,22,513.00	1,59,43,10,716.00

Significant accounting policies 23

Contingent liabilities and Notes on Accounts 24

National Institute of Pharmaceutical Education & Research : Guwahati

INCOME AND EXPENDITURE ACCOUNT for the Year Ended 31st March 2021 (Amount in ₹)

INCOME	Schedule	Current Year	Previous Year
Income from Sale / Services	12		
Grants/ Subsidies	13	14,45,00,000.00	8,46,84,815.00
Fees/ Subscriptions	14	1,27,16,563.00	1,07,48,560.00
Income from Investments (Income on Invest. from earmarked/endow. Funds transferred to Funds)	15		
Income from Royalty, publication etc.	16		
Interest Earned	17	38,07,641.00	43,19,031.00
Other Income	18	21,58,477.00	1,05,27,632.00
TOTAL (A)		16,31,82,681.00	11,02,80,038.00
EXPENDITURE			
Establishment Expenses	19	5,64,69,472.00	3,41,51,826.00
Other Administrative Expenses etc.	20	6,59,71,474.00	5,52,14,900.00
Expenditure on Grants, Subsidies etc.	21		
Interest	22		
Expenditure on Purchase of Fixed Assets	23		
Depreciation (Net total at the year-end- corresponding to Schedule 8)	8		
-Current Period(Net of Deductions)		3,17,14,756.00	2,92,74,045.00
Prior Period Expenses			
- Laboratory Consumables			
Extra Ordinary Item - Loss of Condemnation of Fixed Assets			
TOTAL (B)		15,41,55,702.00	11,86,40,771.00
Balance being excess of Expenditure over Income (A-B)		90,26,979.00	-83,60,733.00
Transfer to Special Reserve (Specify each)			
Transfer to / from General Reserve			
BALANCES BEING SURPLUS/ (DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		90,26,979.00	-83,60,733.00

Significant accounting policies 23
Contingent liabilities and Notes on Accounts 24

National Institute of Pharmaceutical Education & Research : Guwahati

RECEIPTS AND PAYMENTS ACCOUNT for the Year Ended 31st March 2021 (Amount in ₹)

RECEIPTS	Schedule	Current Year	Previous Year	PAYMENTS	Schedule	Current Year	Previous Year
I. Opening Balances				I. Expenses			
a) Cash in hand		1,10,000.00	44,705.00	a) Establishment Expenses	19	5,64,69,472.00	3,41,51,826.00
b) Bank Balances				b) Administrative Expenses	20 & 20A	6,46,08,775.00	5,47,61,823.00
i) In current accounts				II. Payments made against funds for various projects	21		
ii) In deposit accounts		26,44,67,611.00	6,71,48,149.53	III. Investments and deposits made	22		
iii) Savings accounts		3,47,41,072.00	3,31,74,987.47	IV. Expenditure on Fixed Assets & Capital Work-in-Progress			
c) Drafts/Cheques-in-hand				a) Purchase of Fixed Assets		6,59,63,476.00	5,82,68,399.00
d) Grants-in-Transit				b) Expenditure on Capital Work-in-progress		7,21,09,899.00	23,73,73,380.00
II. Receipts from Sale / Service	12			V. Finance Charges (Interest)			
III. Grants Received	1	79,45,00,000.00	43,90,00,000.00	VI. Refund of Surplus Money/Loans/ Security, etc			
IV. Receipt of Fees, etc.	14	1,27,16,563.00	1,07,48,560.00	a) To the Government of India		7,77,572.00	
V. Income on Investments from	15			b) Hostel Fees to Students		15,000.00	
VI. Receipt from Royalty/Publication etc.	16			c) To the State Government			
VII. Interest Received	17	38,07,641.00	43,19,031.00	d) Institute Security Deposits			
VIII. Other Income	18	21,58,477.00	1,05,27,632.00	e) Security Deposit (Vendors)		16,65,000.00	3,70,500.00
				VII. Other Payments (Specify)		19,25,668.00	17,75,429.00
				a) State Cheques			

National Institute of Pharmaceutical Education & Research : Guwahati

RECEIPTS AND PAYMENTS ACCOUNT for the Year Ended 31st March 2021 (Contd...)

RECEIPTS	Schedule	Current Year	Previous Year	PAYMENTS	Schedule	Current Year	Previous Year
IX. Amount Borrowed				b) Duties & Taxes		89,17,469.00	79,68,739.00
				c) Group Insurance Fund		8,07,768.00	5,03,186.00
				d) Advances Recoverable		-	-
				e) Telephone Security Deposit		-	-
				f) TDS deducted		-	-
				g) Security Deposit (GBP)		-	-
X. Any other receipts (give details)				h) Sponsored Projects Expenses		3,07,05,742.00	6,17,88,666.00
- Alumni Fund		6,05,000.00	4,10,000.00	i) Prior Period Expenses		-	-
- Advance Recovered		2,34,449.00	-	j) GST Deposit (Refundable)		-	-
- Group Insurance Fund		4,46,614.00	4,51,931.00	k) Payment against P-Loans & Advances		1,37,800.00	10,600.00
- Institute Security (Refundable)		30,25,000.00	20,50,000.00	l) Payment against Donation (Remittance)		6,028.00	2,82,763.00
- Security Deposit (Vendors)		38,86,800.00	26,73,441.00	m) NPS		88,49,065.00	-
- Duties & Taxes		83,37,889.00	93,44,565.00	VIII. Closing Balances			
- Sponsored Projects Grants & Imprest		14,02,79,155.00	8,26,54,351.00	a) Cash in hand.		1,85,000.00	1,10,000.00
- Additional Imprest		75,000.00	-	b) Bank Balances		-	-
- Benevolent Fund		55,000.00	1,60,500.00	i) In current accounts		45,61,02,086.00	17,09,67,611.00
- Reco.P-Loans & Adv (For other Inst)		1,27,200.00	21,200.00	ii) In deposit accounts		50,67,18,654.00	3,75,32,677.00
- Reco. of Donation		1,58,791.00	1,30,000.00	iii) Savings accounts		-	-
- NPS		62,32,212.00	30,06,546.00	c) Drafts/Cheques-in-hand		-	-
				d) Grants-in-Transit		-	-
TOTAL		1,27,59,64,474.00	66,58,65,599.00	TOTAL		1,27,59,64,474.00	66,58,65,599.00

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 1- CORPUS/CAPTIAL FUND

(Amount in ₹)

	Current Year	Previous Year
Balance as at the beginning of the year	35,06,09,989.00	24,20,28,917.00
Add: Grant Received during the year	79,45,00,000.00	43,90,00,000.00
Less: Grant Utilized for Capital Expenditure	13,80,73,375.00	23,73,73,380.00
Less: Grant Transfer for Revenue Expenditure	14,45,00,000.00	8,46,84,815.00
Add: Contributions towards Corpus/Capital Fund	-	-
Add/(Deduct): Balance of net income/ expenditure) transferred from the Income and Expenditure Account	90,26,979.00	-83,60,733.00
BALANCE AS THE YEAR -END	87,15,63,593.00	35,06,09,989.00

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 2- RESERVES AND SURPLUS

(Amount in ₹)

	Current Year	Previous Year
1. Capital Reserve: (Capital Grants in respect of Fixed Assets purchased)		
As per last Account	-	-
Addition during the year	-	-
Less: Deductions during the year (transfer to Corpus/Capital Fund)	-	-
2. Revaluation Reserve:		
As per last Account	-	-
Addition during the year	-	-
Less: Deductions during the year	-	-
3. Special Reserves:		
As per last Account	-	-
Addition during the year	-	-
Less: Deductions during the year	-	-
4. General Reserve:		
As per last Account	-	-
Addition during the year	-	-
Less: Deductions during the year	-	-
TOTAL		

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 3- EARMARKED/ENDOWMENT FUNDS

	FUND-WISE BREAK UP				TOTALS	
	Alumni Fund	Benevolent Fund	Group Insurance Fund	NIPER Guwahati Campus Construction Fund	Current Year	Previous Year
a) Opening balance of the funds	14,73,302.00	2,99,682.00	3,02,162.00	1,19,90,71,402.00	1,20,11,46,548.00	96,32,53,923.00
b) Additions to the Funds:						
i. Donations/grants	-	-	-	7,21,09,899.00	7,21,09,899.00	23,73,73,380.00
ii. Income from investments made on account of funds	-	-	-	-	-	-
iii. Receipts at the time of Admission	6,05,000.00	55,000.00	4,46,614.00	-	11,06,614.00	10,22,431.00
TOTAL (a+b)	20,78,302.00	3,54,682.00	7,48,776.00	1,27,11,81,301.00	1,27,43,63,061.00	1,20,16,49,734.00
c) Utilization/Expenditure towards objectives of funds						
i. Capital Expenditure						
- Fixed Assets	-	-	-	-	-	-
- Others	-	-	-	-	-	-
TOTAL						
ii. Revenue Expenditure						
- Salaries, Wages and allowances etc.	-	-	-	-	-	-
- Rent	-	-	-	-	-	-
- Other Expenses	-	-	8,07,768.00	-	8,07,768.00	5,03,186.00
TOTAL						
TOTAL (C)					8,07,768.00	5,03,186.00
NET BALANCE AS THE YEAR -END (a+ b-c)	20,78,302.00	3,54,682.00	-58,992.00	1,27,11,81,301.00	1,27,35,55,293.00	1,20,11,46,548.00

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 4- SECURED LOANS AND BORROWINGS

(Amount in ₹)

	Current Year		Previous Year	
1. Central Government	-	-	-	-
2. State Government (Specify)	-	-	-	-
3. Financial Institutions				
a) Term Loans	-	-	-	-
b) Interest accrued and due	-	-	-	-
4. Banks:				
a) Term Loans	-	-	-	-
- Interest accrued and due	-	-	-	-
b) Other Loans (specify)	-	-	-	-
- Interest accrued and due	-	-	-	-
5. Other Institutions and Agencies	-	-	-	-
6. Debentures and Bonds	-	-	-	-
7. Others (Specify)	-	-	-	-
TOTAL	-	-	-	-

Note: Amount due within one year

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 5- UNSECURED LOANS AND BORROWINGS

(Amount in ₹)

	Current Year		Previous Year	
1. Central Government	-	-	-	-
2. State Government (Specify)	-	-	-	-
3. Financial Institutions	-	-	-	-
4. Banks:				
a) Term Loans	-	-	-	-
b) Other Loans (specify)	-	-	-	-
5. Other Institutions and Agencies	-	-	-	-
6. Debentures and Bonds	-	-	-	-
7. Fixed Deposits	-	-	-	-
8. Other (Specify)	-	-	-	-
- Loan for opening of Bank Account	1,000.00	1,000.00	1,000.00	1,000.00
TOTAL	1,000.00	1,000.00	1,000.00	1,000.00

Note: Amounts due within one year

SCHEDULE 6- DEFERRED CREDIT LIABILITIES

(Amount in ₹)

	Current Year		Previous Year	
a) Acceptances secured by hypothecation of capital equipment and other assets	-	-	-	-
b) Others	-	-	-	-
TOTAL	-	-	-	-

Note: Amounts due within one year

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 7- CURRENT LIABILITIES AND PROVISIONS

(Amount in ₹)

	Current Year	Previous Year
A. CURRENT LIABILITIES		
1. Acceptances		
2. Sundry Creditors:		
a) Goods		
i) For Non Capital Goods	15,71,075.00	4,96,099.00
ii) For Capital Goods	50,51,252.00	
b) Others	10,42,765.00	7,55,042.00
3. Advances Received		
4. Interest accrued but not due on:		
a) Secured Loans/borrowings		
b) Unsecured Loans/borrowings		
5. Statutory Liabilities:		
a) Overdue		
- Professional Tax Payable		
b) Others		
- Assam VAT		-
- Professional Tax Payable	2,610.00	12,354.00
- TDS	10,25,772.00	15,95,608.00
6. Other current Liabilities		
- Unspent Balance of Grants in respect of Sponsored Projects	26,31,62,845.00	2,50,42,811.00
- Stale Cheques (A/c. Transfer)		-
- Margin Money Refund	65,76,074.00	
- Security Deposit (Vendors)	59,83,062.00	40,21,930.00
- Remittance recovered payable	3,89,693.00	28,64,383.00
- Institute Security Deposit (Refundable)/ Caution Money	55,07,683.00	41,47,683.00
TOTAL (A)	29,03,12,831.00	3,89,35,910.00
B. PROVISIONS		
1. For Taxation		
2. Gratuity		
3. Superannuating/Pension		
4. Accumulated Leave Encashment		
5. Trade Warranties/Claims		
6. Others		
- C&AG Audit Fees	-	1,63,785.00
- Chief Engg. Assam PWD Roads	32,60,194.00	32,60,194.00
- APDCL (Energization works)		
- IIT Guwahati (NIPER Campus)		
- Electricity Charges	2,80,000.00	1,22,458.00
- Telephone, Fax & Internet	49,602.00	70,832.00
TOTAL (B)	35,89,796.00	36,17,269.00
TOTAL (A+B)	29,39,02,627.00	4,25,53,179.00

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 7A- SUNDRY CREDITORS FOR GOODS

(Amount in ₹)

	Current Year	Previous Year
SUNDRY CREDITORS FOR NON CAPITAL GOODS (A)		
M/s. Palampur Bio, Secunderabad		73,990.00
M/s. Abhigyan Traders	58,800.00	
M/s. Eurasian Associates	44,758.00	
M/s. GCC Biotech India Pvt Ltd	18,968.00	
M/s. YMC India Pvt Ltd	44,100.00	
M/s. SP Enterprise	7,298.00	
M/s. National Liver Disease Biobank	39,375.00	
M/s. North East Chemical Corporation	7,19,690.00	4,22,109.00
M/s. Krishna Enterprise	28,445.00	
M/s. Naural Remedies Pvt. Ltd	1,24,762.00	
M/s. Twinkle Creation	22,510.00	
M/s. Bhabani Printers	97,000.00	
M/s. Phenomenex India Pvt Ltd	1,80,533.00	
M/s. Eppendorf India Pvt Ltd	1,38,663.00	
M/s. Valency Lab Equipments Pvt. Ltd	39,401.00	
M/s. Uma Enterprise	6,772.00	
TOTAL (A)	15,71,075.00	4,96,099.00
SUNDRY CREDITORS FOR NON CAPITAL GOODS (B)		
M/s. Agilent Technologies	50,51,252.00	-
TOTAL (B)	50,51,252.00	-
TOTAL (A+B)	66,22,327.00	4,96,099.00

SCHEDULE 7B- SUNDRY CREDITORS FOR OTHERS

(Amount in ₹)

	Current Year	Previous Year
SUNDRY CREDITORS FOR OTHERS		
Vehicle Rentals	2,21,672.00	2,35,387.00
Dr. Mishbahur Rahman		-
NIPER Mohali		
Brahmaputra Travels		
Speed Tours		
Guwahati Biotech Park	31,680.00	1,95,493.00
Ashok Senapati	-	45,000.00
Sterling Securities	2,82,784.00	2,79,162.00
Other Expenses Payable		
Stipend Payable		
Administrative Remuneration		
Rajendra Sharma		
K.H. Enterprise	5,06,629.00	-
TOTAL	10,42,765.00	7,55,042.00

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 8- FIXED ASSETS

Description	Rate of Depreciation (%)	GROSS BLOCK			DEPRECIATION			NET BLOCK	
		Cost/valuation at the beginning of the year	Additions during the year	Deductions during the year	Depreciation for FY. 2020-21	Addition / (Deletion) on deduction	Total up to the year-end	As at the current year-end	As at the previous year-end
A. Fixed Assets									
1. Land									
a. Free hold		-	1.00	-	-	-	-	1.00	-
b. Lease hold									
Plant & Machineries	15	92,57,900.00	31,52,143.00	-	13,25,937.00	40,89,435.00	83,20,608.00	64,94,402.00	
Laboratory Equipments	15	18,55,00,242.00	3,05,88,324.00	-	2,32,33,349.00	7,84,25,760.00	13,76,62,806.00	13,03,07,831.00	
Office Equipment	15	16,57,570.00	68,33,689.00	-	8,93,280.00	16,38,076.00	68,53,183.00	9,12,774.00	
Furniture & Fixtures	10	2,86,23,141.00	59,84,469.00	-	29,02,999.00	74,36,254.00	2,71,71,356.00	2,40,89,886.00	
Audio Visual	15	10,82,108.00	24,87,725.00	-	2,68,045.00	8,07,046.00	27,62,787.00	5,43,107.00	
Books & Journals	40	43,74,418.00	7,38,470.00	-	5,56,841.00	39,21,641.00	11,91,247.00	10,09,618.00	
COMPUTERS & PERIPHERALS	40	73,69,216.00	71,73,485.00	-	25,34,305.00	76,18,091.00	69,24,610.00	22,85,430.00	
Small Assets	100	59,825.00	-	-	59,825.00	-	-	-	
TOTAL of current year (A)		23,79,24,420.00	5,69,58,306.00	-	3,17,14,756.00	10,39,96,128.00	19,08,86,598.00	16,56,43,048.00	
Previous year		18,70,50,588.00	5,08,73,832.00	-	2,92,74,045.00	7,22,81,372.00	16,56,43,048.00	14,40,43,260.72	
B. Capital works in progress									
Construction of Boundary Wall (Assam PWD)		4,72,60,194.00	-	-	-	-	4,72,60,194.00	4,72,60,194.00	
Construction of NIPER Campus (EPL)		1,15,28,11,208.00	7,21,09,899.00	-	-	-	1,22,49,21,107.00	1,15,28,11,208.00	
TOTAL of Current year (B)		1,20,00,71,402.00	7,21,09,899.00	-	-	-	1,27,21,81,301.00	1,20,00,71,402.00	
Previous year		96,26,98,022.00	23,73,73,380.00	-	-	-	1,20,00,71,402.00	96,26,98,022.00	
TOTAL (A+B)		1,43,79,95,822.00	12,90,68,205.00	-	3,17,14,756.00	10,39,96,128.00	1,46,30,67,899.00	1,36,57,14,450.00	

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 9- INVESTMENTS FROM EARMARKED/ENDOWMENT FUNDS

(Amount in ₹)

	Current Year	Previous Year
1. In Government Securities	-	-
2. Other approved Securities	-	-
3. Shares	-	-
4. Debentures and Bonds	-	-
5. Subsidiaries and joint Ventures	-	-
6. Others (to be specified)	-	-
TOTAL	-	-

SCHEDULE 10- INVESTMENTS - OTHERS

(Amount in ₹)

	Current Year	Previous Year
1. In Government Securities	-	-
2. Other approved Securities	-	-
3. Shares	-	-
4. Debentures and Bonds	-	-
5. Subsidiaries and Joint Ventures	-	-
6. Others (to be specified)	-	-
TOTAL	-	-

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 11- CURRENT ASSETS, LOANS and ADVANCES ETC.

(Amount in ₹)

	Current Year	Previous Year
A. CURRENT ASSETS:		
1. Sundry Debtors:		
a) Debts Outstanding for a period exceeding six months		
b) Others		
2. Cash balances in hand	1,85,000.00	1,10,000.00
3. Bank Balances:		
a) With Scheduled Banks:		
- On Current Accounts		-
- On deposit accounts	45,61,02,086.00	17,09,67,611.00
- On Saving Accounts	50,67,18,654.00	3,75,32,677.00
b) With non-Scheduled Banks:		
- On Current Accounts		
- On Deposit Accounts		
- On Saving Accounts		
4. Post Office – Saving Accounts		
5. Drafts / Cheques In Hand		
6. Grants-in-Transit		
TOTAL (A)	96,30,05,740.00	20,86,10,288.00

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SCHEDULES FORMING PART OF BALANCE SHEET as at 31st March 2021

SCHEDULE 11- CURRENT ASSETS, LOANS, and ADVANCES ETC. (Contd.)

(Amount in ₹)

	Current Year		Previous Year	
B. LOANS, ADVANCES AND OTHER ASSETS				
1. Loans:				
a) Staff			-	
b) Other entities engaged in activities similar to that of the Entity			-	
c) Other (specify)			-	-
2. Advances and other amounts recoverable in cash or in kind or for value to be received:				
a) On Capital Account			-	
- GST Refund receivable from Custom Authorities	36,88,703.00		36,88,703.00	
b) Prepayments	90,05,171.00		1,60,42,275.00	
c) Security Deposits	2,50,000.00		2,50,000.00	
d) Others	5,000.00	1,29,48,874.00	5,000.00	1,99,85,978.00
3. Income Accrued:				
a) On Investments from Earmarked/Endowment Funds			-	
b) On Investments – Others			-	
c) On Loans and Advances			-	
d) Others (includes income due unrealized- Rs...)			-	-
4. Claims Receivable - TDS Receivable			-	-
TOTAL (B)		1,29,48,874.00		1,99,85,978.00
TOTAL (A+B)		97,59,54,614.00		22,85,96,266.00

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF INCOME & EXPENDITURE
for the year ended 31st March 2021

SCHEDULE 12- INCOME FROM SALES/SERVICES

(Amount in ₹)

	Current Year	Previous Year
1) Income from Sales		
a) Sale of Finished Goods		
b) Sale of Raw Material		
c) Sale of Scraps		
2) Income from Services		
a) Labour and processing Charges		
b) Professional/Consultancy Services		
c) Agency Commission and Brokerage		
d) Maintenance Services (Equipment/Property)		
e) Others (Overhead Charges)		
TOTAL		

SCHEDULE 13- GRANTS/SUBSIDIES

(Amount in ₹)

	Current Year	Previous Year
(Irrevocable Grants & Subsidies Received)		
1) Central Government (Transfer from Schedule - 1 for Recurring Expenses)	14,45,00,000.00	8,46,84,815.00
2) State Government(s)		
3) Government Agencies		
4) Institutions/ Welfare Bodies		
5) International Organizations		
6) Others (Specify)		
TOTAL	14,45,00,000.00	8,46,84,815.00

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF INCOME & EXPENDITURE
for the year ended 31st March 2021

SCHEDULE 14- FEES/SUBSCRIPTIONS

(Amount in ₹)

	Current Year	Previous Year
1) Admission Fees	2,42,000.00	1,64,000.00
2) Semester Fees	1,07,73,393.00	1,05,05,860.00
3) Seminar/Program Fees		-
4) Consultancy Fees	22124	
5) Others (Specify)		
- Sponsorships		-
- Conference Fees		-
- Convocation Fees		78,700.00
- Employment Application Fees	12,13,046.00	
- Hostel Fees	2,42,000.00	
- Placement Fees	2,20,000.00	
- Tender Fees	4,000.00	
TOTAL	1,27,16,563.00	1,07,48,560.00

NOTE – Accounting Policies towards each item are to be disclosed - Accounted on Receipt Basis

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF INCOME & EXPENDITURE
for the year ended 31st March 2021

SCHEDULE 15- INCOME FROM INVESTMENTS

(Amount in ₹)

	Current Year		Previous Year	
(Income on Invest. from Earmarked/Endowment Funds transferred to Funds)				
1) Interest				
a) On Govt. Securities	-	-	-	-
b) Other Bonds/Debentures	-	-	-	-
2) Dividends:				
a) On Shares	-	-	-	-
b) On Mutual Fund Securities	-	-	-	-
3) Rents	-	-	-	-
4) Others (Specify)	-	-	-	-
TOTAL	-	-	-	-
TRANSFERRED TO EARMARKED/ENDOWMENT FUNDS	-	-	-	-

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SCHEDULES FORMING PART OF INCOME & EXPENDITURE
for the year ended 31st March 2021

SCHEDULE 16- INCOME FROM ROYALTY, PUBLICATION ETC.

(Amount in ₹)

	Current Year	Previous Year
1) Income from Royalty		
2) Income from Publications		
3) Others (specify)		
TOTAL		

SCHEDULE 17- INTEREST RECEIVED

(Amount in ₹)

	Current Year	Previous Year
1) On Term Deposits:		
a) With Schedule Banks	13,86,572.00	27,15,363.00
b) With Non-Scheduled Banks		
c) With Institutions		
d) Others		
2) On Savings Accounts:		
a) With Scheduled Banks	24,21,069.00	16,03,668.00
b) With Non-Scheduled Banks		
c) Post Office Savings Accounts		
d) Others		
3. On Loans:		
a) Employees/ Staff		
b) Others		
4) Interest on Debtors and Other Receivables		
TOTAL	38,07,641.00	43,19,031.00

NOTE – Tax deducted at source to be indicated

National Institute of Pharmaceutical Education & Research : Guwahati

SCHEDULES FORMING PART OF INCOME & EXPENDITURE
for the year ended 31st March 2021

SCHEDULE 18- OTHER INCOME

(Amount in ₹)

	Current Year	Previous Year
1) Profit on Sale/disposal of Assets:		
a) Owned assets:		
b) Assets acquired out of grants, or received free of cost		
2) Export Incentives realized		
3) Fees for Miscellaneous Service Income (Overhead Charges)	15,87,388.00	18,60,750.00
4) Miscellaneous	5,71,089.00	86,66,882.00
TOTAL	21,58,477.00	1,05,27,632.00

SCHEDULE 19- ESTABLISHMENT EXPENSES

(Amount in ₹)

	Current Year	Previous Year
PAID (A)		
a) Salaries, Honorarium and Wages	5,64,69,472.00	3,41,51,826.00
b) Allowances and Bonus		
c) Contribution to Provident Fund		
d) Contribution to Other Fund (specify)		
e) Staff Welfare Expenses		
f) Expenses on 'Employees'		
g) Others (specify)		
TOTAL (A)	5,64,69,472.00	3,41,51,826.00
PAYABLE (B)		
a) Salaries and Wages		
b) Allowances and Bonus		
c) Contribution to Provident Fund		
d) Contribution to Other Fund (specify)		
e) Staff Welfare Expenses		
f) Expenses on 'Employees'		
g) Others (specify)		
TOTAL (B)		
TOTAL (A+B)	5,64,69,472.00	3,41,51,826.00

SCHEDULE 19A- ESTABLISHMENT EXPENSES

(Amount in ₹)

	Current Year	Previous Year
PREVIOUS YEAR OUTSTANDING PAID DURING THE YEAR		
a) Salaries, Honorarium and Wages		
b) Allowances and Bonus		
c) Contribution to Provident Fund		
d) Contribution to Other Fund (specify)		
e) Staff Welfare Expenses		
f) Expenses on 'Employees'		
g) Others (specify)		
TOTAL		

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SCHEDULES FORMING PART OF INCOME & EXPENDITURE
for the year ended 31st March 2021

SCHEDULE 20- OTHER ADMINISTRATIVE EXPENSES ETC.

(Amount in ₹)

	Current Year	Previous Year
PAID (A)		
a) Honorarium to Visiting Faculty	86,700.00	4,39,900.00
b) Stipend to Students	2,86,63,121.00	2,59,30,430.00
c) Hiring of Vehicles	45,24,367.00	40,32,334.00
d) Laboratory Consumables (including chemicals, animals & animal feeds)	1,57,05,748.00	45,39,298.00
e) Traveling, Hotel Accomodation and Conveyance Expenses	4,04,170.00	16,25,925.00
f) Printing and Publicity	5,81,106.00	7,46,258.00
g) Convocation & Examination	1,09,904.00	7,95,096.00
h) Rentals / Hiring	30,06,761.00	77,47,556.00
i) House Keeping/Maintenance/Security	11,40,551.00	8,40,452.00
j) Contingencies/Miscellaneous	20,29,439.00	21,59,913.00
k) Foundation Day Celebrations	1,444.00	58,500.00
l) Repairs & Upgradation	1,88,173.00	81,576.00
m) CAG Audit Fees	-	3,10,050.00
n) NIPER Sports Meet and Other Meets	-	1,88,685.00
o) Admission Charges	2,85,560.00	94,300.00
p) Student Placement, Training & Other Expenditure	3,45,518.00	
q) LC & Forex Charges	4,44,181.00	61,696.00
r) Electricity Expense	20,70,337.00	8,35,180.00
s) Students Hostel Rentals and Other Expenses	2,21,985.00	8,08,194.00
t) Seminar, Conferences, Workshops, Meetings, etc.	5,90,000.00	7,81,795.00
u) Administrative Charges to Mentor Institute	-	
w) Advertisement Expenses	5,75,991.00	4,99,114.00
y) Internet and IT Expenses	12,38,688.00	12,87,507.00
z) Sponsorship Expenses (paid)	-	1,00,000.00
a1) Postal and Courier Charges	47,781.00	-
b1) Consultancy fees	6,09,600.00	-
c1) Admin & Lab Expense (out of Imprest adjustments)	4,86,509.00	-
TOTAL (A)	6,33,57,634.00	5,39,63,759.00
PAYABLE (B)		
a) Honorarium to Visiting Faculty		
b) Stipend to Students		
c) Hiring of Vehicles	2,21,672.00	2,35,387.00
d) Laboratory Consumables (including chemicals, animals & animal feeds)	15,71,075.00	4,96,099.00
e) Traveling and Conveyance Expenses		
f) Printing and Publicity		
g) Convocation & Examination		
h) Rentals / Hiring	31,680.00	2,40,493.00
i) House Keeping/Maintenance/Security	2,82,784.00	2,79,162.00
j) Contingencies/Miscellaneous		
k) C&AG Audit Fees Provision		
l) Admission Charges		
m) Repairs & Upgradation	5,06,629.00	
n) Students Hostel Rentals and Other Expenses		
o) Administrative Charges to Mentor Institute		
TOTAL (B)	26,13,840.00	12,51,141.00
TOTAL (A+B)	6,59,71,474.00	5,52,14,900.00

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SCHEDULES FORMING PART OF INCOME & EXPENDITURE
for the year ended 31st March 2021

SCHEDULE 20A- OTHER ADMINISTRATIVE EXPENSES ETC.

(Amount in ₹)

	Current Year	Previous Year
PREVIOUS YEAR OUTSTANDING PAID/ADJUSTED DURING THE YEAR		
a) Honorarium to Visiting Faculty	-	-
b) Stipend to Students	-	-
c) Hiring of Vehicles	2,35,387.00	3,61,728.00
d) Laboratory Consumables (including chemicals, animals & animal feeds)	4,96,099.00	
e) Traveling and Conveyance Expenses		
f) Printing and Publicity		
g) Convocation & Examination		
h) Rentals / Hiring	2,40,493.00	1,77,175.00
i) House Keeping/Maintenance/Security	2,79,162.00	5,642.00
j) Contingencies/Miscellaneous	-	2,53,519.00
l) Repairs & Upgradation		
n) NIPER Sports Meet		
o) Hostel Payments		-
p) Admission Charges		
q) Administrative Charges to Mentor Institute		
TOTAL	12,51,141.00	7,98,064.00

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SCHEDULES FORMING PART OF INCOME & EXPENDITURE
for the year ended 31st March 2021

SCHEDULE 21- PAYMENTS MADE AGAINST FUNDS FOR VARIOUS PROJECTS

(Amount in ₹)

	Current Year	Previous Year
a) Grants given to Institutions/ Organizations	-	-
b) Subsidies given to Institutions/Organizations	-	-
TOTAL	-	-

SCHEDULE 22- INVESTMENTS MADE DURING THE YEAR

(Amount in ₹)

	Current Year	Previous Year
1. In Government Securities	-	-
2. Other approved Securities	-	-
3. Shares	-	-
4. Debentures and Bonds	-	-
5. Subsidiaries and Joint Ventures	-	-
6. Others (to be specified)	-	-
TOTAL	-	-

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SCHEDULES FORMING PART OF ACCOUNTS for the year ended 31st March 2021

SCHEDULE 23- SIGNIFICANT ACCOUNTING POLICIES

1. ACCOUNTING CONVENTION

The financial statements are prepared on the basis of historical cost convention, unless otherwise stated and on the accrual method of accounting in general.

2. FIXED ASSETS

Fixed Assets are stated at cost of acquisition inclusive of inward freight, duties and taxes and incidental and direct expenses related to acquisition.

3. DEPRECIATION

- 3.1 Depreciation is provided on Written-Down-Value Method (WDV) as per rates specified in the Income tax Act, 1961.
- 3.2 Assets costing Rs. 5,000/- or less each are fully provided. No depreciation is provided on assets not put to use.

4. GOVERNMENT GRANT/SUBSIDIES

- 4.1 Government grants of the nature of contribution towards capital cost of setting up projects are treated as Capital Reserve.
- 4.2 Grants in respect of specific fixed assets acquired are shown as a deduction from the cost of the related assets.
- 4.3 Government grants/subsidy are accounted on realization basis.

5. OTHER INCOME

Interest income, income by way of fees, etc. is generally accounted for on receipt basis. Interest on savings bank account is accounted for as and when the same is credited by the bank.

6. RETIREMENT BENEFITS

No provisions have been made for gratuity, leave encashment, etc. in absence of any guideline in this regard from the Ministry of Chemical and Fertilizers, Govt. of India.

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SCHEDULES FORMING PART OF ACCOUNTS for the year ended 31st March 2021

SCHEDULE 24- CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS

1. CONTINGENT LIABILITIES

- I) Bank Guarantees worth NIL have been given in respect of import of Laboratory Equipments.
- II) Capital Commitment in respect of Purchase orders worth Rs. 2304.69 Lakhs have been due for supply/payment for the year ended 31st March 2020.

2. TAXATION

In view of there being no taxable income under Income-tax Act 1961, no provision for Income tax has been considered necessary.

3. FOREIGN CURRENCY TRANSACTIONS

3.1 Value of Imports Calculated on C.I.F Basis:

- Purchase of finished Goods – NIL
- Raw, Materials & Components (Including in transit) – NIL
- Capital Goods – 10.61754 lakhs
- Stores, Spares and Consumables – NIL

3.2 Expenditure in Foreign currency:

- a) Travel – NIL
- b) Remittances and Interest Payment to Financial Institutions/ Banks in Foreign Currency – NIL
- c) Other expenditure
 - Commission on Sales – NIL
 - Legal and Professional Expenses - NIL
 - Miscellaneous Expenses – NIL

3.3. Earnings:

Value of Exports on FOB basis - NIL

4. Corresponding figures for the previous year have been regrouped/rearranged, wherever necessary.
5. Government of Assam has allotted 275 Bighas of Freehold Land to the Ministry of Chemical and Petrochemicals in January 2008 for the construction of the permanent campus of NIPER Guwahati.
6. Schedules 1 to 24 are annexed to and form an integral part of the Balance Sheet as at 31st March, 2021 and the Income and Expenditure Account for the year ended on that date.

