AMITY UNIVERSITY
—LUCKNOW CAMPUS—

TWO-DAY INTERNATIONAL CONFERENCE

ON

NEXT-GENERATION THERAPEUTICS: INTEGRATING NANOTECHNOLOGY WITH ADVANCED DRUG DISCOVERY PLATFORMS

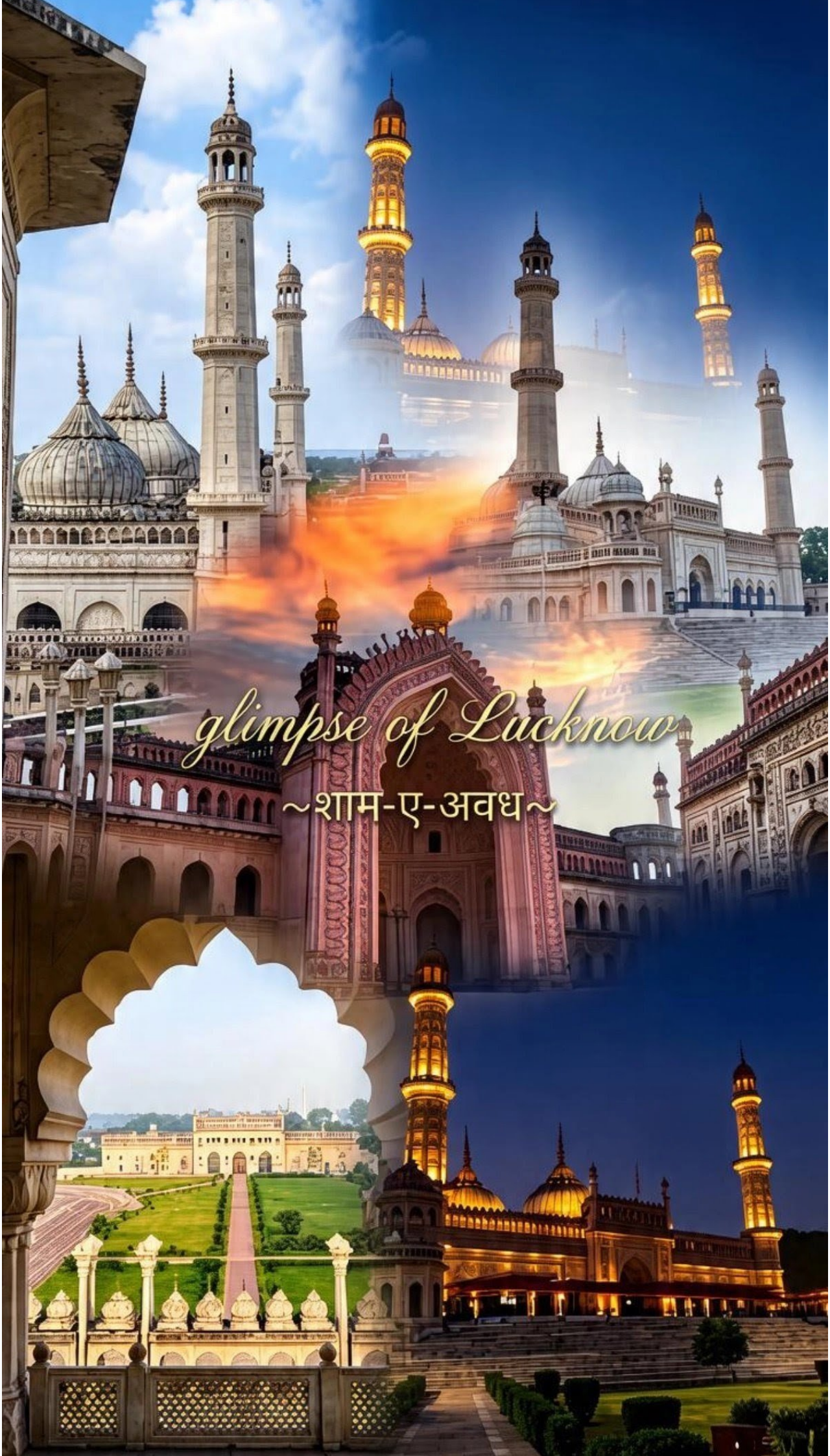
15-16TH SEPTEMBER 2026



SOUVENIR 2026

Organised by

AMITY INSTITUTE OF PHARMACY
AMITY UNIVERSITY UTTAR PRADESH
LUCKNOW CAMPUS


glimpse of Lucknow
~शाम-ए-अवध~

AMITY UNIVERSITY
—LUCKNOW CAMPUS—

TWO-DAY INTERNATIONAL CONFERENCE

ON

NEXT-GENERATION THERAPEUTICS: INTEGRATING NANOTECHNOLOGY WITH ADVANCED DRUG DISCOVERY PLATFORMS

15-16TH SEPTEMBER 2026



SOUVENIR 2026

Organised by

AMITY INSTITUTE OF PHARMACY
AMITY UNIVERSITY UTTAR PRADESH
LUCKNOW CAMPUS



FOUNDER PRESIDENT'S MESSAGE

It is a matter of great pride that Amity Institute of Pharmacy (AIP), Amity University Uttar Pradesh (AUUP), Lucknow Campus is organizing **"Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms",** on Tuesday, 15th September and Wednesday, 16th September 2026.

The rapidly evolving landscape of healthcare demands innovative therapeutic approaches that can translate scientific discoveries into safer, more precise, effective, and accessible treatments. In this context, the integration of nanotechnology with advanced drug discovery platforms represents a transformative opportunity by enabling targeted drug delivery, improving bioavailability, reducing toxicity, and facilitating personalized and precision medicine. When combined with contemporary approaches such as computational drug discovery, artificial intelligence, molecular pharmacology, biomarker-guided therapy, etc., it can significantly accelerate the journey from laboratory research to clinical application. Therefore, the conference is highly timely and relevant to deliberate upon emerging challenges, share innovative perspectives, and explore meaningful solutions.

I welcome the distinguished academicians, scientists, researchers, industry leaders, and other subject experts who are participating in this conference. Their collective expertise and exchange of ideas will be highly inspiring, motivating and enriching for brilliant students, research scholars, Ph.D scholars, faculty members and other worthy participants and provide them new insight in this important area for societal benefit. The conference will provide a platform for forging bonds and mutual cooperation, undertaking joint research projects and joint publications, for achieving long-term goals and contacts for mutual benefits.

I compliment Prof. (Dr.) Satya Prakash Singh, Principal & Deputy Director, Amity Institute of Pharmacy, AUUP, Lucknow Campus, all the members of organising committee including Organising Secretaries, Prof. (Dr.) Vivek Srivastava, Professor, AIP, AUUP, Lucknow Campus, Dr. Rahul Kumar Maurya, Associate Professor, AIP, AUUP, Lucknow campus, Dr. Shashank Soni, Associate Professor, AIP, AUUP, Lucknow Campus as well as the dedicated faculty members, brilliant students, research scholars and staff for their sincere efforts to organise the event. I appreciate Prof. (Dr.) Anil Vashisht, Pro VC, AUUP, Lucknow campus and Wg. Cdr. (Dr) Anil Tiwari, Dy Pro VC, AUUP, Lucknow campus for their valuable guidance. My appreciation also goes to Dr. Balvinder Shukla, Vice Chancellor, AUUP for her advice and cooperation.

The most strategic and unparalleled leadership of Dr. Aseem Chauhan Ji, Resp. Chairman, AUUP, Lucknow campus & Addl. President, Ritnand Balved Education Foundation (RBEF), would lead to outcome based and result oriented success of the Conference. The best wishes from our most visionary and exemplary leader, Dr. Atul Chauhan Ji, Hon'ble Chancellor, AUUP & President, RBEF, would always be there for a fruitful, meaningful, and successful event.

I warmly welcome all participants and hope they have a memorable and enriching experience that not only contributes to the goals of the conference but also leave a profound impact on the fellow participants.

(Dr. Ashok K. Chauhan)
Founder President
Ritnand Balved Education Foundation (RBEF)
(The Foundation of Amity Universities, Institutions & Amity International Schools)

Message from Pro Vice Chancellor



I am pleased to learn that the Amity Institute of Pharmacy, Amity University, Lucknow, is organizing a two-day International Conference on "Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms" on 15th-16th September 2026.

The role of nanotechnology when integrated with modern tools of science and technology is increasingly gaining global recognition. This conference is timely and relevant, as it provides a platform for researchers, academicians, and industry experts to deliberate on the convergence of nano-engineering with pharmaceutical sciences areas that hold tremendous promise in addressing contemporary healthcare challenges. I believe such platforms also pave the way for integrating traditional knowledge with cutting-edge innovations, thereby creating holistic solutions for society.

The conference is one of a kind to discuss the advances and challenges in the field of pharmaceutical research. It is also an opportunity to develop new collaborations among researchers, clinicians, and industrialists through invited lectures, oral presentations, poster presentations, and young scientist presentations.

I extend my warm felicitations to the organizers, Conference Chair and Hol, AIP, AUUP along with all the organizing secretaries and wish the conference great success in fostering collaborations, generating impactful ideas, and inspiring young researchers to contribute to the vision of a smarter India.

Prof. (Dr.) Anil Vashisht
Pro Vice Chancellor
Amity University Uttar Pradesh, Lucknow Campus

NIPER
RAEBARELI

शुभिनी अ सराफ
एम. फार्म, पीएचडी
निदेशक

Shubhini A Saraf
M. Pharm, PhD
Director

सत्यमेव जयते

राष्ट्रीय औषधीय शिक्षा एवं अनुसंधान संस्थान, रायबरेली
(औषध विभाग, रसायन और उर्वरक मंत्रालय, भारत सरकार)
बिजनौर-सिसेंडी रोड, सीआरपीएफ बेस कैम्प के निकट, सरोजनी नगर,
पोस्ट ऑफिस : माती, लखनऊ–226002

National Institute of Pharmaceutical Education and Research, Raebareli
(Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers, Govt. of India)
Bijnor-Sisendi Road, Near CRPF Base Camp, Sarojini Nagar,
Post Office : Mati, Lucknow (UP)- 226002

Message

It is a matter of immense pleasure and privilege to extend my heartfelt greetings and best wishes to the distinguished academicians, eminent scientists, industry leaders, researchers, and young scholars participating in the International Conference being hosted by Amity University, Lucknow, on **"Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms."** Hosting a conference of such academic and scientific eminence is indeed a moment of great pride.

A molecule that failed as a drug may not have failed as a therapeutic—it may simply have been waiting for the right technology. The opportunity before the scientific community is therefore not merely to discover more molecules. It is to build technologies that allow us to rescue promising candidates, predict their behaviour earlier, optimise them more intelligently, test them in more relevant biological systems and deliver them more precisely. The integration of nanotechnology with advanced drug discovery platforms represents a powerful step towards this vision. The future of therapeutics may increasingly be characterised by integration rather than isolation. Drug discovery will not exist separately from drug delivery. Formulation development will not begin only after a molecule has been selected. In this emerging paradigm, nanotechnology can accompany a therapeutic candidate through almost its entire journey—from molecule conception and screening to formulation, preclinical evaluation, targeted delivery, clinical translation, and therapeutic monitoring.

I am confident that this International Conference will provide a vibrant platform for the exchange of ideas, dissemination of cutting-edge research, and meaningful collaboration among academia, industry, and regulatory stakeholders.
I extend my best wishes for the success of the conference and an enriching experience for all participants.

(Shubhini A Saraf)



MESSAGE

It gives me immense pleasure to extend my warm greetings and best wishes on the occasion of the International Conference on **"Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms,"** being organized by Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, on **15th–16th September 2026**.

The convergence of **nanotechnology with advanced drug discovery and therapeutic sciences** represents a significant paradigm shift in modern healthcare. Nanotechnology offers unprecedented opportunities to design precise, targeted, and intelligent drug delivery systems capable of improving therapeutic efficacy while minimizing adverse effects. Innovations in nanomedicine, nano-enabled diagnostics, targeted delivery, and stimuli-responsive therapeutic systems are paving the way towards more personalized and patient-centric healthcare.

The rapidly evolving interface of **nanotechnology, artificial intelligence, computational drug discovery, biotechnology, and pharmaceutical sciences** further emphasizes the importance of interdisciplinary research. Meaningful collaboration among academia, industry, healthcare professionals, and research organizations is essential to transform innovative scientific concepts into safe, effective, and accessible therapeutic solutions.

Conferences of this nature provide an invaluable platform for the exchange of knowledge, dissemination of emerging research, and creation of meaningful scientific collaborations. I am confident that the deliberations during this conference will inspire innovative thinking, encourage young researchers, and contribute significantly to advancing the frontiers of nanotechnology and next-generation therapeutics.

I commend the organizers for their efforts in bringing together the scientific community on this important platform and wish the conference every success. May the conference generate new ideas, foster impactful collaborations, and contribute towards building a healthier and scientifically advanced society.

Best wishes for a successful and intellectually enriching conference.

Wg. Cdr. (Dr.) Anil Kumar (Retd)
Deputy Pro Vice Chancellor & Director, ASET
Amity University Uttar Pradesh, Lucknow Campus



MESSAGE

It is a matter of great pride that Amity Institute of Pharmacy, AMITY University Uttar Pradesh, Lucknow Campus, is hosting the International Conference on **"Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms"**, scheduled to be held on **15th–16th September 2026**. The conference provides an important platform for bringing together contemporary advances in nanotechnology, drug discovery, molecular sciences and therapeutic development. The convergence of nanotechnology with advanced drug discovery platforms is opening new avenues for the development of safer, more precise and effective therapeutic interventions. I am confident that the participation of eminent academicians, researchers, industry professionals and young scholars from India and abroad will facilitate meaningful intellectual exchange, interdisciplinary dialogue and opportunities for collaborative research.

The deliberations of the conference are expected to highlight emerging technologies, innovative approaches and translational opportunities in next-generation therapeutics. The interactions will inspire young researchers and students to pursue innovative, interdisciplinary and solution-oriented research addressing contemporary challenges in healthcare and medicine. The objectives of the conference resonate strongly with our commitment to academic excellence, research, innovation and impactful outcomes. The scientific discussions and exchange of ideas during the conference will contribute to strengthening collaborations and advancing knowledge at the interface of nanotechnology and drug discovery.

I wish the conference great success and hope that it will be a stimulating, outcome-oriented and intellectually enriching platform with translational potential, paving the way for new ideas, meaningful collaborations and significant advances in the development of next-generation therapeutic solutions.

Prof. (Dr.) Rajesh K. Tiwari
Dean, Academics
Director AMITY Institute of Biotechnology
Amity University Uttar Pradesh, Lucknow



MESSAGE

It gives me immense pleasure to note that an **International Conference on "Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms, "** is organized by Amity Institute of Pharmacy scheduled to be held on 15th to 16th September 2026. From the last 2 decades we learn the clear benefits of nanotechnology in the various sectors of science and technology. Its application in the development of advance therapies is also remarkable. Its amalgamation with advance drug discovery is the theme of this conference. While looking for its potential application we must seriously consider its limitations also. Focus is also required on potential health risks associated with engineered nanomaterials (ENMs), intensified by the limited understanding of what makes ENMs toxic and how to make them safe. As the use of ENMs for commercial purposes and the number of workers/end-users being exposed to these materials on a daily basis increase, the need for assessing the potential adverse effects of multifarious ENMs in a time- and cost-effective manner, becomes more relevant to understand.

Therefore, this conference aims to bringing together a large number of distinguish nanotechnologist and biologist from all over the world to discuss the latest advancement on the synthesis, characterization, biological application and toxicity of materials at atomic level for better use in advance drug discovery. I hope that the conference will be academically stimulating and technically rewarding for the participants. I understand that many eminent nanotechnologist and biologist drawn from various part of the world are coming to share their rich experience with the delegates. This conference would be an exciting opportunity for delegates to network in their multidisciplinary research domains.
I extend very warm welcome to the guests and delegates and wish that conference would be a great success.

Prof. (Dr.) J.K. Srivastava
Deputy Dean Research (AULC)
Chairperson -DRC (AIBAS)
Amity University Uttar Pradesh, Lucknow Campus

FKKT | UNIVERSITY OF LJUBLJANA
Faculty of Chemistry and Chemical Technology

prof. dr. Jernej Iskra

Department of Chemistry and Biochemistry
tel: +386 1 4798 519 fax: +386 1 2419 144
e-mail: jernej.iskra@fkkt.uni-lj.si



MESSAGE

It is a great privilege to join this International Conference on Next-Generation Therapeutics, a gathering that captures an overarching concept of modern science: the boundaries between disciplines are dissolving. Nanotechnology, drug discovery, and materials science are no longer parallel fields but a single, interconnected frontier, and it is at this frontier that the most meaningful scientific breakthroughs are emerging and translating into new applications. One such intersection, that I am interested in, is exploring lignin-based chemicals and nanomaterials as sustainable platforms for delivery and sensing applications. Biomass, and lignin in particular, is far more than a renewable feedstock; it is a source of inherent chemical knowledge, offering a rich architecture of functional groups shaped by nature itself. Choosing renewable sources over conventional metal-based nanoparticles is not only an environmental imperative but a scientific advantage: lignin's inherent biocompatibility and biodegradability directly address two of nanomedicine's most persistent challenges, systemic toxicity and long-term nanoparticle accumulation, while enabling functional, low-impact platforms for controlled release and sensing in real-world environments. Furthermore, nano-scale bioactive systems impart precision to their action, and targeted, controlled-release strategies minimize off-target effects, a principle equally valuable in therapeutics and in agriculture. Lignin-based platforms sit naturally at this crossover.

This is where innovation and interdisciplinary collaboration become indispensable. Translating a raw biopolymer into a functionally rich platform demands dialogue between chemists, materials scientists, biotechnologists, pharmacologists, and engineers, each contributing a distinct lens to a shared challenge. I believe the future of nanomedicine will belong not to isolated breakthroughs, but to these collaborative ecosystems, where green chemistry, nanotechnology, and drug discovery converge to produce therapeutics that are both effective and responsible.

I look forward to engaging with fellow researchers here, and I hope our discussions build the collaborations needed to move sustainable, biomass-derived nanomaterials across disciplines and applications.

Sincerely yours,
Prof. (Dr.) Jernej Iskra
Professor in Organic Chemistry,
Faculty of Chemistry & Chemical Technology, University of Ljubljana, Slovenia



MESSAGE

The development of next-generation therapeutics requires more than discovering new drug molecules—it requires innovative strategies to transform promising molecules into safe, effective and clinically useful medicines. Nanotechnology is increasingly providing powerful tools to bridge this gap by enabling precise control over drug solubility, stability, bioavailability, targeting and delivery. However, the true potential of nanotechnology will be realised through its integration with advances in drug discovery, computational science, artificial intelligence, biotechnology and personalised medicine.

My research in pharmaceutical particle engineering and pulmonary drug delivery has reinforced the importance of understanding the relationship between the physicochemical properties of therapeutic molecules, engineered micro- and nanoparticles, delivery systems and biological performance. Technologies such as spray drying and spray freeze-drying provide exciting opportunities to engineer particles for efficient and targeted delivery, including the delivery of antibiotics, biologics and other emerging therapeutics to the lungs. The future of drug development will increasingly depend on interdisciplinary collaboration, bringing together pharmaceutical scientists, chemists, biologists, clinicians, engineers, computational scientists and industry partners. Equally important is the translation of innovative discoveries into scalable, reproducible and patient-centred therapies.

This conference provides an excellent platform to exchange ideas, challenge conventional approaches and build international collaborations. I look forward to sharing perspectives and learning from colleagues working at the forefront of nanotechnology, drug discovery and advanced therapeutics. Together, through innovation and collaboration, we can accelerate the journey from discovery to delivery and ultimately from laboratory research to better patient outcomes.

PROFESSOR SHYAMAL DAS (he/him)
PhD, MPharm, BPharm(Hons.)
School of Pharmacy and Pharmacology | He Rau Kawakawa
University of Otago | Ōtākou Whakaihu Waka
Adams Building, 18 Frederick Street, Dunedin | Ōtepoti
New Zealand | Aotearoa
Email/Īmera shyamal.das@otago.ac.nz
Website/Pae tukutuku www.otago.ac.nz/pharmacy/people/profile?id=1496



MESSAGE

It gives me immense pleasure to extend my warm greetings to everyone associated with the Two-Day International Conference on "Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms." This timely conference offers an important platform for exploring how nanotechnology, artificial intelligence, precision medicine, and advanced drug-discovery approaches can be integrated to create safer, effective, and more patient-centric therapies.

I congratulate the Amity Institute of Pharmacy, Amity University, Lucknow Campus, and the entire organizing team for bringing together distinguished scientists, academicians, clinicians, industry professionals, and young researchers from India and abroad. Their dedicated efforts will undoubtedly encourage meaningful scientific dialogue, interdisciplinary collaboration, and the translation of innovative research into practical healthcare solutions.

I believe that this conference will also motivate young researchers and students to pursue innovative ideas with scientific curiosity, ethical responsibility, and a commitment to serving humanity. By connecting emerging scholars with experienced experts, the event can nurture future leaders who will advance pharmaceutical research and shape the next generation of healthcare. I do hope that the deliberations inspire new ideas, strengthen professional partnerships, and contribute to addressing global healthcare challenges.

I wish the conference every success and hope this souvenir serves as a lasting record of the knowledge, collaboration, and shared commitment that define this significant occasion.

Dr. SHREESH OJHA
Professor
Department of Pharmacology & Therapeutics
College of Medicine & Health Sciences
PO Box - 15551, United Arab Emirates University
Al Ain, Abu Dhabi, UAE
Tel: 00971-50-3125748
00971-3-7137524



MESSAGE

It gives me immense pleasure to welcome you to the two-day International Conference on *"Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms,"* being organized by the Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, on 15–16 September 2026.

The rapid convergence of nanotechnology, artificial intelligence, computational approaches, and novel drug discovery platforms is reshaping the landscape of modern therapeutics. This conference seeks to offer a vibrant forum for academicians, researchers, scientists, healthcare professionals, industry experts, and students to share knowledge, present pioneering research, and deliberate on emerging opportunities and challenges in next-generation drug development.

The Abstract Book before you stands as a valuable compendium of the scientific contributions featured during the conference. I sincerely acknowledge the efforts of all contributors and reviewers, whose rigorous work has greatly enriched this academic endeavour. I am confident that the deliberations, presentations, and exchanges over the course of this event will spark meaningful collaborations, inspire transformative research, and help translate cutting-edge discoveries into effective, patient-centric therapeutic solutions.

I extend my warm greetings and best wishes to every participant. May this conference prove to be academically enriching, scientifically stimulating, and professionally rewarding.

Wishing you all a successful and memorable conference.

Prof. (Dr.) Satya Prakash Singh
Principal and Deputy Director,
Amity Institute of Pharmacy Lucknow
Amity University Uttar Pradesh, Lucknow Campus

From the Editor's Desk

It is with great pleasure and a deep sense of academic fulfilment that we present this Abstract Book of the Two-Day International Conference on **"Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms,"** organized by the Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus.

This volume brings together a diverse spectrum of scientific ideas, research findings, and emerging perspectives contributed by academicians, scientists, researchers, clinicians, industry professionals, and young investigators. The abstracts reflect the rapidly evolving landscape of pharmaceutical sciences, encompassing nanotechnology-enabled therapeutics, advanced drug discovery, innovative drug delivery systems, computational approaches, precision medicine, and translational research.

Beyond being a compilation of scientific contributions, this Abstract Book represents a shared commitment to innovation, interdisciplinary collaboration, and the pursuit of solutions to contemporary healthcare challenges. We hope that the ideas presented herein will stimulate scientific dialogue, inspire new research directions, foster meaningful collaborations, and contribute to the development of safe, effective, sustainable, and patient-centric therapeutics.

We sincerely acknowledge and appreciate the valuable contributions of all authors and participants whose scientific enthusiasm and intellectual efforts have enriched this conference. We trust that this collection will serve as a meaningful reference and inspire continued exploration at the frontiers of next-generation healthcare and pharmaceutical research.

— The Editorial Team

Media Partner

We express our gratitude to the editors of the *International Journal of Pharmaceutical Sciences and Research* for publishing the abstract book of Two-Day International Conference on "Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms," organized by the Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus on 15-16th September 2026. This abstract book is published with valid ISSN (No. 2584-2781) and ISBN (No. 978-81-180526-7-8) identifiers.

Sponsors

ABOUT THE EVENT

The Two-Day International Conference on "Next-Generation Therapeutics: Integrating Nanotechnology with Advanced Drug Discovery Platforms" aims to bring together distinguished scientists, academicians, clinicians, pharmaceutical researchers, industry professionals, regulatory experts, and young investigators from across the globe to discuss recent advances and emerging trends in nanotechnology-enabled therapeutics and innovative drug discovery approaches. The conference will serve as a multidisciplinary platform for exchanging knowledge, presenting cutting-edge research, fostering collaborations, and addressing current challenges in translating laboratory discoveries into clinically successful therapies.

The rapid evolution of nanotechnology, artificial intelligence (AI), machine learning, computational drug design, precision medicine, genomics, biotechnology, and advanced pharmaceutical formulations has transformed the landscape of modern therapeutics. The integration of these technologies offers unprecedented opportunities to improve drug efficacy, enhance bioavailability, achieve targeted drug delivery, minimize adverse effects, and accelerate the development of personalized medicines. This conference seeks to explore these innovations while highlighting translational research, regulatory considerations, commercialization strategies, and future directions for next-generation healthcare.

Participants will gain valuable insights through keynote lectures, invited talks, technical sessions, poster presentations, and oral presentations led by internationally renowned experts. The conference also aims to encourage interdisciplinary collaborations between academia, healthcare institutions, research organizations, and pharmaceutical industry to develop innovative solutions for addressing global healthcare challenges.

By providing a common platform for scientific exchange, the conference will inspire novel research ideas, strengthen international partnerships, and contribute toward the advancement of sustainable, patient-centric, and technology-driven therapeutic strategies for the future.





CHIEF PATRON

Hon'ble Dr. Ashok K. Chauhan

Founder President, RBEF,
Amity University Uttar Pradesh, Noida



CO– CHIEF PATRON

Dr. Aseem Chauhan

Chairman
Amity University Lucknow, Campus

PATRONS



Prof. (Dr.) Balvinder Shukla

Vice Chancellor
Professor-Entrepreneurship
Leadership & IT, Amity University Uttar Pradesh
Senior Vice President, RBEF, Noida



Dr. W. Selvamurthy

President-Amity Science, Technology & Innovation Foundation (ASTIF)
Director General - Amity Directorate of Science & Innovation
Chancellor, Amity University Chhattisgarh
(Former Distinguished Scientist and Chief Controller R&D(LS), DRDO)

CO-PATRONS



Prof. (Dr.) Anil Vashisht
Pro Vice Chancellor
Amity University Uttar Pradesh,
Lucknow Campus



Wg. Cdr. (Dr.) Anil Kumar (Retd)
Deputy Pro Vice Chancellor & Dir ASET
Amity University Uttar Pradesh,
Lucknow Campus



Prof. (Dr.) Rajesh K. Tiwari
Dean Academics
Director, Amity Institute of Biotechnology,
Amity University Uttar Pradesh, Lucknow Campus
Ph.D. & Post-Doctorate, Professor of Biotechnology



Prof. (Dr.) Qamar Rahman
Distinguished Professor & Dean Research
Amity University, Uttar Pradesh,
Lucknow Campus

KEYNOTE SPEAKER



Prof. (Dr.) Shubhini A. Saraf
Director, NIPER Raebareli
Former Director-in-Charge, NIPER Hajipur
Professor and Ex- Director (R&D), BBAU, Lucknow
Ex-Head (Dept. of Pharm. Sciences), BBAU, Lucknow
Ex-Dean, School of Biomedical and Pharmaceutical Sciences, BBAU, Lucknow
Ex-Dean, School of Biosciences & Biotechnology, BBAU, Lucknow

ESTEEMED SPEAKERS



Prof. (Dr.) Jernej Iskra
Professor in Organic Chemistry,
Faculty of Chemistry & Chemical Technology,
University of Ljubljana, Slovenia



Prof. (Dr.) Shyamal Das
Professor
School of Pharmacy and Pharmacology
University of Otago Dunedin, New Zealand



Prof. (Dr.) Shreesh Ojha
Professor of Pharmacology & Therapeutics
College of Medicine & Health Sciences
United Arab Emirates University,
Al-Ain, Abu Dhabi, UAE



Dr. Sandeep Chaudhary
Associate Professor
Department of Medicinal Chemistry,
Bioactive Heterocycles & Catalysts Laboratory
NIPER-R Lucknow



Dr. Vikram Singh
Scientist D, Analytical Sciences Group, ASSIST Division,
CSIR- Indian Institute of Toxicology Research, Lucknow



Prof. (Dr.) Gaurav Kaithwas
Director (Operations)UttarPradeshPromote Pharma Council &
Professor, Department of Pharmaceutical Sciences, Babasaheb Bhimrao Ambedkar University, Lucknow

CONFERENCE CHAIRPERSON



Prof. (Dr.) Satya Prakash Singh
Principal & Deputy Director,
Amity Institute of Pharmacy
Amity University Uttar Pradesh, Lucknow Campus

ORGANISING SECRETARIES



Prof. (Dr.) Vivek Srivastava
Professor
Amity Institute of Pharmacy
Amity University Uttar Pradesh, Lucknow Campus



Dr. Rahul Kumar Maurya
Associate Professor
Amity Institute of Pharmacy
Amity University Uttar Pradesh, Lucknow Campus



Dr. Shashank Soni
Associate Professor
Amity Institute of Pharmacy
Amity University Uttar Pradesh, Lucknow Campus

CONTACT INFORMATION

Prof. (Dr.) Vivek Srivastava
E mail: vsrivastava1@lko.amity.edu Mob: 9451079244

Dr. Rahul K. Maurya
E mail: rkmaurya@lko.amity.edu Mob: 7505747322

Dr. Shashank Soni
E mail: ssoni@lko.amity.edu Mob: 9410572306

Institutional Working Committees

Sr. No.	Committee Name	Faculty In-charge/Co- In-charge
(1)	**Chairperson**	Prof. (Dr.) Satya Prakash Singh
(2)	**Organizing Secretaries**	Prof. (Dr.) Vivek Srivastava Dr. Shashank Soni Dr. Rahul K. Maurya
(3)	**Registration Committee**	Dr. Supriya Roy Dr. Arnica F. Lal Dr. Amit Keshari Dr. Anila Mishra Mrs. Upama Singh Mrs. Swati Wadhawan Mr. Hansraj Kumar Ms. Prachi Pandey
(4)	**Feedback Committee**	Dr. Priya Pathak Dr. Newtan Deb Ms.Yashi Srivastava
(5)	**Certificate & Prize distribution**	Dr. Suman Baishnab Dr. Diksha Srivastava Mrs. Sakshi Srivastava Mrs. Swati Wadhawan
(6)	**Treasurer**	Prof. (Dr.) Narahari N. Pillai Prof. (Dr.) Amit Kumar
(7)	**Brochure Committee**	Dr. Ankita Misra Mr. Abhishek Singh Ms. Kakli Rai Dr. Yashi Srivastava
(8)	**Outcome Report**	Dr.Lucy Mohapatra Dr. Richa Srivastava Mrs.Chandani Nigam
(9)	**Scientific Committee**	Pharmaceutics Prof. (Dr.) Nimisha Dr. Poonam Parashar Pharmaceutical Chemistry

		Prof. (Dr.) Abhishek Tiwari Dr. Zeeshan Fatima Pharmacology Prof. (Dr.) Ramesh Gupta Dr. Swati Prakash Biotechnology/Pharmacognosy Prof. (Dr.) Varsha Tiwari Prof. (Dr.) Silpi Chanda Mrs. Swati Wadhawan
(10)	**Moderators/Emcee**	Prof. (Dr.) Neha Mathur Dr. Lucy Mohapatra
(11)	**IT Support**	Dr. Ankita Misra Mrs. Sakshi Srivastava Mr. Vishal Kumar Vishwakarma
(12)	**Press media & Photography**	Dr. Sunita Thakur Mr. Purnendra Gupta
(13)	**Hall Management**	Dr. Zeeshan Fatima Dr. Vishakha Jaiswal Dr. Abhishek Pandey Ms. Nivedita Chatterjee Ms. Priya Sahni Mr. Mayank Pal
(14)	**Sponsorship**	Dr. Richa Srivastava Dr. Neeraj Jain Mr. Rishabh Chaurasia
(15)	**Hospitality & Transportation**	Dr. Suman Baishnab Mr. Shobhit Srivastava Mr. Harshit Pal Mr. Mayank Pal
(16)	**Food & catering**	Dr. Abhishek Tiwari Dr. Mandeep Gupta Mr. Vishal Vishwakarma Ms. Vineeta Rawat
(17)	**Discipline**	Prof. (Dr.) Narahari N. Palei Dr. Poonam Parashar Mr. Abhishek Singh



INDEX

S.No.	CODE	Authors	Topic	Page No.
1.	**INADDP/PL/OF/01**	Dinesh Kumar Gond[1], Dr. Virendra Kumar Maurya[2]*, Kamlesh Kumar[3]	Phytochemical profiling and evaluation of the antioxidant and anti-arthritic potential of *crassula ovata* leaf extract in an experimental model of arthritis	1
2.	**INADDP/PL/OF/02**	Rudransh Maurya[1], Dr. Virendra Kumar Maurya[2]*, Kamlesh Kumar[3]	Mechanistic evaluation of the anti-inflammatory and antioxidant potential of *azadirachta indica* leaf extract in experimental inflammation	1
3.	**INADDP/PL/OF/03**	Vipin Tiwari[1], Md Kaish[1*] Divyash Singh[1]	Integrating stimuli-responsive nanotechnology with advanced drug discovery platforms for intravenous inhibition of myocardial infarction	3
4.	**INADDP/PL/ON/04**	Tarul Patel[1], Salil Tiwari*[1]	Artificial intelligence and nanotechnology: integrating computer-aided drug design for the discovery of novel antihypertensive therapeutics	4
5.	**INADDP/PL/OF/05**	Shruti Patel[1], Vivek Shrivastava[1]*	Ack1/tnk2 signaling in cancer: a molecular framework and precision therapeutics	5
6.	**INADDP/PL/OF/06**	Sakshi Shukla[1], Dr Ramesh Kumar Gupta[1*]	Nanotechnology-enabled therapeutic strategies for amyotrophic lateral sclerosis: bridging molecular pathogenesis and advanced drug delivery	5
7.	**INADDP/PL/ON/07**	Milind Shinde[1,2], Suneela Dhaneshwar*[1]	Antiretroviral prodrugs for improved acquired immunodeficiency syndrome therapy	6
8.	**INADDP/PL/ON/08**	Rajni Mishra*[1], Dr Ashish Singhai[1], Dr Mukesh Singh Sikarwar[2]	In-vitro antioxidant and antidiabetic activity of shatavarin-encapsulated saponinosomes from *asparagus racemosus*	7

9.	**INADDP/PL/ON/09**	Ragini Tandle[1], Suneela Dhaneshwar[1]*	Breaking the hepatic barrier: advanced pharmaceutical architectures for targeted delivery to liver	8
10.	**INADDP/PL/OF/10**	Pushpa Kumari[1], Dr. Vivek Srivastava[1*]	Emerging therapeutic strategies for optic nerve degeneration	9
11.	**INADDP/PL/OF/11**	Manorma Patel[1], Dr. Ramesh Kumar Gupta[1]*	Sustainable nano-carrier for treating post-menopausal metabolic and bone disorders	10
12.	**INADDP/PL/OF/12**	Ankit Yadav[1], Dr. Sunil Kumar Singh[1]*	Evolution of anti-anxiety potential of *luffa cylindrica* flower extract: a review	11
13.	**INADDP/PL/OF/13**	[1]Chandra Shekhar Mishra*	Biosimilars: bridging innovation and affordable healthcare—global regulatory evolution, market access, and India's emerging role	12
14.	**INADDP/PL/ON/14**	Aimen Salman[1], Tarique Mahmood[1]*, Rufaida Wasim[1]	Targeting the folate pathway in cardiovascular complications: emerging nanotherapeutics and advanced drug discovery approaches	13
15.	**INADDP/PL/ON/15**	Anjana Yadav[1,2], Suneela Dhaneshwar[1*]	From dysbiosis to gut homeostasis: the emerging role of multi-strain probiotics in irritable bowel syndrome	14
16.	**INADDP/PL/OF/16**	Khushi Prajapati[1] , Khushi Gupta[1*]	Post-marketing surveillance	15
17.	**INADDP/PL/OF/17**	Khushi Prajapati[1], Dr Ramesh Kumar Gupta [1*]	PCOS management: from lifestyle modification and exercise to nanotechnology-enabled drug delivery	15

18.	**INADDP/PL/ON/18**	Sudeshna Mohapatra[1,2], Suneela Dhaneshwar*[1]	Lactobacillus rhamnosus as a microbiome-based adjunct in graves' disease: mechanistic insights, translational evidence, and a framework for targeting the gut–thyroid axis	16
19.	**INADDP/PL/ON/19**	Shekhar Pal[1], Anjali[1]*	Artificial intelligence and nanotechnology used for prediction of pharmacokinetics and pharmacodynamics of thyroid drugs	17
20.	**INAPDD/PL/OF/20**	Deepak Yadav[1], Dr Prakash Chandra Gupta*[1], Dr Nisha Sharma[1], Dr Anju Singh[1]	From food waste to therapeutic value: a sustainable pharmacognostic and green chemistry approach for exploring the hepatoprotective potential of watermelon rind against ethanol-induced hepatotoxicity	18
21.	**INAPDD/PL/OF/21**	Aniruddh Pratap Singh[1]*, Yati Sharma[1], Jeetendra Kumar Gupta[1]	Modulation of the gut–brain axis by *balanites aegyptiaca* l. In experimental inflammatory bowel disease-associated neuroinflammation and cognitive dysfunction	19
22.	**INAPDD/PL/OF/22**	Ankita Yadav[1]*, Dr Vivek Srivastava[1]	Dendrimers in neurological disease therapy: emerging nanoplatform for targeted drug delivery	20
23.	**INAPDD/PL/OF/23**	Ashok Kumar Yadav[1], Shruti Srivastava[2*] Manish Kumar[3],	Artificial intelligence and machine learning in drug impurity profiling: from prediction and identification to toxicological risk assessment	21
24.	**INAPDD/PL/OF/24**	Abeera Imran[1], Archit Akhil[1], Dr. Mohini Chaurasia*[1], Dr. Raj Kumar Tiwari*[2], Dr. Alok Tripathi*[3]	Bridging the gap between prophylactic efficacy and public health: a comprehensive review of hpv vaccination and cervical cancer awareness strategies	22

25.	**INAPDD/PL/OF/25**	Shaqib Ali[1] Dr. Rahul Kumar Maurya*[1]	Targeting csf1r in neuroinflammation: from microglial biology to small-molecule drug discovery	23
26.	**IPDNAD/PL/OF/26**	Divyanshi Gupta [1,2], Lucy Mohapatra[1*], Ankita Wal[2]	Coumarin ameliorates letrozole-induced polycystic ovary disorder in virgin female wistar rats by targeting inflammatory pathways	24
27.	**IPDNAD/PL/OF/27**	Rishi Shukla[1], Swati Prakash[*1]	A study on epigenetic alterations caused by environmental thallium exposure	25
28.	**IPDNAD/PL/OF/28**	Satyam Tiwari[1], Supriya Roy[1*]	Precision therapeutics in the management of neurological disorders	26
29.	**INADDP/PL/OF/29**	Shivani Singh1, Supriya Roy1*	AI tools for integrative disease-to-drug discovery	27
30.	**INADDP/PL/OF/30**	Ragini Singh [1] , Dr. Swati Prakash [1*]	Emerging non-opioid targets for chronic pain management	27
31.	**INADDP/PL/OF/31**	Kumari Jyoti , Suraj Singh Yadav	Nanotechnology in surgery : the future of ultra – precise and minimally invasive surgery	28
32.	**INADDP/PL/ON/32**	Nitika Yadav, Vivek Srivastava	Therapeutic inhibition of ferroptosis in neurodegenerative disease: current advances and future directions	29
33.	**INADDP/PL/OF/33**	Devendra Pratap Singh, Supriya Roy*	SGLT2 inhibition as a novel strategy against anthracycline-induced cardiotoxicity	30
34.	**INADDP/PL/OF/34**	Kanav Katoch[1], Lucy Mohapatra 1*	Immunomodulators as a therapeutic frontier	31

35.	**INADDP/PL/OF/35**	Sudhanshu Singh1, Sakshi Srivastava2	Exosome-based nanocarriers for inflammatory diseases: current advances and future perspectives	32
36.	**INADDP/PL/ON/36**	Abhishek Kumar And Ruchi Yadav	Unraveling the genetic and transcriptomic landscape of chronic respiratory diseases: a multi-omics comparative study for targeted therapeutics	32
37.	**INADDP/PL/OF/37**	Stefna Varghese[1], Vivek Srivastava[*1]	Fibromirs as a new frontier in antifibrotic drug discovery	34
38.	**INADDP/PL/OF/38**	Mahira Siddiqui[1] , Purnendra Kumar Gupta[*1]	Network pharmacology-based identification of natural products targeting liver diseases	34
39.	**INADDP/PL/OF/39**	Aryan Tiwari[1], Lucy Mohapatra 1*	Cell based assays: from conventional models to next generation platforms	35
40.	**INADDP/PL/OF/40**	Sara Ali[1], Purnendra Kumar Gupta[1]*	Liver-on-a-chip technology for predicting drug-induced liver	36
41.	**NADDP/PL/OF/41**	Ojas Tripathi[1], Rahul Kumar Maurya[1]*	HIF-1α as a master regulator of neurovascular and neurodegenerative pathologies: mechanisms, drug discovery, and therapeutic advances	37
42.	**INADDP/PL/OF/42**	Akshat Chauhan*, Vivek Srivastav	Copper dysregulation & cuproptosis in cardiovascular disorders: mechanistic	38
43.	**INADDP/PL/OF/43**	Himanshu Singh, Varsha Tiwari*, Abhishek Tiwari	Recent advancement in tuberculosis therapy	39
44.	**INADDP/PL/OF/44**	Purushottam Kumar1, Lucy Mohapatra[1]	Fermented food and their beneficial effects on brain: a review	40
45.	**INADDP/PL/OF/45**	Shakshi Rai, Dr. Alok Mukerjee	Nanotechnology in alzheimer's disease: pharmacological applications and therapeutic perspectives	41

46.	**INADDP/PL/OF/46**	Sumit Kumar Singh[1], Chandani Nigam[1]	Emerging therapeutic strategies for polycystic ovary syndrome: current advances, challenges, and future prospects	42
47.	**INADDP/PL/OF/47**	Shashank Bajpai[1], Lucy Mohapatra[1*]	Apoptosis in parkinson's disease: a new therapeutic target	43
48.	**INADDP/PL/OF/48**	Vaibhav Singh[1], Supriya Roy[1]	Nanotechnology- based therapeutic strategies for hepatotoxicity	43
49.	**INADDP/PL/OF/49**	Anmol Yadav[1], Swati Prakash*[2]	Tau-targeted antisense oligonucleotide therapy in alzheimer's disease: a next-generation disease-modifying approach	44
50.	**INADDP/PL/OF/50**	Jaya Singh[1], Lucy Mohapatra[1*], Himani Awasthi[2]	Evaluating the cardioprotective effects of silymarin against cardiac hypertrophy in rats by targeting the gut-cardiac-axis	45
51.	**INADDP/PL/OF/51**	Harshit Pal[1], Dr Ramesh Kr. Gupta[*1]	Investigation of the neuroprotective effect of soybean extract and piper nigrum extract in cadmium-induced	46
52.	**INADDP/PL/OF/52**	Mr. Hansraj Kumar[1], Prof (Dr.) Ramesh Gupta [2]	Network pharmacology-based elucidation of neolamarckia cadamba bark underlying the	47
53.	**INADDP/PL/OF/53**	Riddhi Mishra[1], Neha Mathur[1]	Epigallocatechin-3-gallate (egcg) as an emerging therapeutic candidate for uterine fibroids: mechanisms and clinical perspectives.	48
54.	**INADDP/PL/OF/54**	Gargi Medhi, Dr. Ramesh Kr. Gupta*	Stimuli-responsive nanogels for precision topical therapies of psoriasis: exploiting the inflammatory microenvironment for controlled drug release	49
55.	**INADDP/PL/OF/55**	Aman Kumar Soni, Dr. Ramesh K Gupta*	Current pharmacological management of rheumatoid arthritis: from dmards to biologics	50

56.	**INADDP/PL/OF/56**	Abhishek Yadav, Poonam Parashar	Atrial septal defect (asd): a comprehensive overview of diagnosis and management	51
57.	**INADDP/PL/OF/57**	Priya Sahani, Ramesh Kumar Gupta	Unravelling the multi targeted antidepressant mechanism of flavonoids: insights into molecular signalling pathways	51
58.	**INADDP/PL/OF/58**	Shree Singh*, Swati Prakash	Impact of plastic and microplastic exposure on female reproductive toxicity: exploring the gut microbiota–ovarian axis link	52
59.	**INADDP/PL/OF/59**	Harsh Jain [1], Dr. Lucy Mohapatra1*	Insulin and the demented brain: from metabolic dysfunction to Neurodegeneration	53
60.	**INADDP/PL/OF/60**	Qazi Faiza, Dr.S P Singh	Microneedle assisted transdermal drug delivery : evaluate the microneedle approach for improving the Drug permission through topical delivery	54
61.	**INADDP/PT/ON/01-O**	Ananya Mishra	Depression-associated cognitive dysfunction: emerging nanotechnology-based strategies for brain-targeted therapeutics	56
62.	**INADDP/PT/ON/02-O**	Nain Patel, Ms. Swathi Gariganti	Recent advances in nanocarrier-based trans ungual drug delivery for the management of onychomycosis	56
63.	**INADDP/PT/ON/03-O**	Devanshi Jaiswal, Swathi Gariganti	From nature to nanomedicine: bioinspired nanocarriers for precision and targeted drug delivery	57
64.	**INADDP/PT/ON/04-O**	Natasha Senapati, Khushboo Lavania*	Next-generation bioinspired nanocarriers for targeted oral mucosal drug delivery	58
65.	**INADDP/PT/ON/05-O**	Marjita Chakma[1], Dr. Anindita De[2]*	Bioinspired microneedle systems for peptide delivery: from innovative design to clinical translation	59
66.	**INADDP/PT/ON/06-O**	Kishan Thumbar, Aditya Singh*	Flavonoid–silver complex: engineering a multifunctional metal-based therapeutic for next-generation cancer treatment	60
67.	**INADDP/PT/ON/07-O**	Parth Sonani*, Dr. Rupalben K. Jani	Nanotechnology-enabled precision pulmonary drug delivery for non-small cell lung cancer	61

68.	**INADDP/PT/ON-08-O**	Nidhi Radadiya*, Khushboo Lavania	Ai-driven nanocarrier design for personalized drug delivery: integrating machine learning with formulation pttimization	
69.	**INADDP/PT/ON/09-O**	Pratiksha Sabalea B, Suneela Dhaneshwara	Next-generation therapeutics: integrating nanotechnology with advanced drug discovery platformstargeting the spleen: an underexplored frontier in drug delivery	62
70.	**INADDP/PT/ON/10-O**	Reetu*Associate Professor,	Ai-enabled multi-omics-guided nanosponges for precision drug delivery: opportunities and translational challenges	63
71.	**INADDP/PT/ON/11-O**	Rishabh Chaurasiya, Satya Prakash Singh*, Ankur Srivastava	Next-generation alzheimer's therapeutics: bioactive compound-loaded nanostructured lipid carriers for intranasal nose-to-brain delivery	64
72.	**INADDP/PT/ON/12-O**	Shreya Singh, Narahari Narayan Palei	Electrospun nanofibers enabled metallic organic framework for enhanced wound healing	66
73.	**INADDP/PT/ON/13-O**	Rajshree Tung[1], Nimisha	Antibiotic delivery systems using liposomes: a potential nanotechnological approach for combating antimicrobial resistance	67
74.	**INADDP/PT/ON/14-O**	Km.Priya[1], Dr. Poonam Parashar	In situ gelling system for gastric retention and sustained drug release	68
75.	**INADDP/PT/ON/15-O**	Authors: Asra Azmi[1], Swati Sharma[2], Mohd Ahmad[3], Juber Akhtar[4], Mohammad Javed Ansari[5]	Ion-activated in situ gel platform for enhanced ocular delivery of co-trimoxazole: a qbd-driven smart delivery approach for next-generation antimicrobial therapeutics	68
76.	**INADDP/PT/ON/16-O**	Prachi Pandey1, Narahari Narayan Palei1, Muhammad Arif2	Niosomal phytoconstituents delivery as a strategy for remodelling the wound microenvironment	69

77.	**INADDP/PT/ON/17-O**	Kakli Rai, Poonam Parashar*, Yogesh Kumar	Nanotechnology-enabled phlorotannin's for next-generation wound healing therapeutics	70
78.	**INADDP/PT/ON/18-O**	Pushkar Nanwani[1], Kapil Kumar[2]*	Theranostic "nano-swarm" platform: computationally designed pancreatic micelles with real-time biosensing feedback for personalized dosing	71
79.	**INADDP/PT/ON/19-O**	Pankaj D Bari[1], Pankaj[2], C Bhamare *	Characterization techniques and regulatory aspects review for liposomal amphotericin-b for injection.	72
80.	**INADDP/PT/OF/20-O**	Rishabh Gupta*	Formulation and evaluation of ursolic acid loaded nano formulation (transferosomes) for the management of dermatological disorders	73
81.	**INADDP/PT/OF/21-O**	Prachi Mishra And Usha Shukla	Physics-driven smart nanocarriers for next-generation therapeutics: integrating Quantum nanotechnology with advanced drug discovery platforms	74
82.	**INADDP/PT/OF/22-O**	Sneha Sharma, Ankita Gupta*, Upasana Singh, Priyanka Keshari, Akanksha Tiwari	Nano-enhanced kidcool-f: a taste-masked nanptarticle-loaded fast-dissolving oral film for pediatric fever management	75
83.	**INADDP/PT/OF/23-O**	Abhishek Pal*	Integrated nanotechnology in drug delivery systems: advancing targeted, controlled and next-generation therapeutics	76
84.	**INADDP/PT/OF/24-O**	Parmar Manishkumar Kantibhai*, Manisha Lalan	Lipid-based nanocarrier systems for essential oils in wound healing: a next-generation nanotherapeutic approach	77
85.	**INADDP/PT/OF/25-O**	Rath Swagat, Dr Ks Rajesh*, Dr Dhaval Pethani, Dr Pradeep Dabhi	Nanotechnology-integrated mucoadhesive buccal films: bridging the gap between drug discovery and systemic therapeutic delivery	78
86.	**INADDP/PT/ON/01-P**	Gitesh Dhat[1], Dr. Pinkal Patel*, Pratima Patel	Smart nanocarriers for targeted drug delivery: the future of precision therapeutics	79

87.	**INADDP/PT/ON/02-P**	Kamal Kumar[1], Rishabh Gupta*	Adaptive surface-switching nanocarriers for targeted drug delivery: navigating biological barriers	80
88.	**INADDP/PT/ON/03-P**	Pritam Patel[1], G.S Chakraborthy, Janki Thakkar*	Drug shortages and regulatory gaps affecting medicine availability	80
89.	**INADDP/PT/ON/04-P**	Priya Tiwari, Uma Shankar Maurya*	Nanotechnology in drug delivery: from conventional non-carriers to targeted and precision therapeutics	81
90.	**INADDP/PT/ON/05-P**	Shweta Singh[1], Dr. Snigdha Bhardwaj*	Nose to brain delivery for migraine or parkinson treatment: advances, mechanisms, and therapeutic potential	82
91.	**INADDP/PT/ON/06-P**	Shahroz Choudhary, Dr. Kinjal Parmar*	Rna nanomedicine: regulation challenges and emerging pathways advanced nanocarriers for targeted delivery of mrna, sirna, and gene-editing therapeutics	83
92.	**INADDP/PT/ON/07-P**	Bhoomika Jambhore, Hiralben Mehta, Janki Thakkar*	Integrating digital therapeutics and nanotechnology for precision medicine	84
93.	**INADDP/PT/ON/08-P**	Garima Singh, Madhaw Kumar*	From predictive nanocarrier design to precision therapeutics: an ai-integrated translational platform for next-generation drug discovery	85
94.	**INADDP/PT/ON/09-P**	Vandana Pal, Barkha Maurya, Lovely*	Nanotechnology-based drug delivery for brain disorders	86
95.	**INADDP/PT/ON/10-P**	Diksha Singh, Vikas Srivastava*	Artificial intelligence-assisted design of nanomedicines	87
96.	**INADDP/PT/ON/11-P**	Barkha Maurya, Lovely Yadav[1*]	Nanotechnology in transdermal drug delivery	88
97.	**INADDP/PT/ON/12-P**	Surbhi S. Chavhan	Develpment and evaluation of almond oil-loaded nanoliposomes for intranasal delivery in alzheimer's disease	89
98.	**INADDP/PT/ON/13-P**	Anjali Rai*	Role of 3d printing in controlled drug release for diabetes: glipizide	89

99.	**INADDP/PT/ON/14-P**	Snigdha Mishra, Hiralben Mehta*	Regulatory roadblocks in targeted nanomedicine translation	90
100.	**INADDP/PT/ON/15-P**	Ujjwal Godse, Sweta Patel, Janki Thakkar*	Quality by design aptroaches in nanotherapeutic manufacturing	91
101.	**INADDP/PT/ON/16-P**	Pratima Prajapati[1]*	Nanoparticles in targeted drug delivery: a novel approach	92
102.	**INADDP/PT/ON/17-P**	Sneha Chauhan[1], Saloni Jaiswal[2]*	Ai-driven 3d brain-on-a-chip platform for high-throughput screening of targeted nanotherapeutics in multiple sclerosis	92
103.	**INADDP/PT/ON/18-P**	Utkrisht Mahajan[1], Krishna Arjun Bhatia[2*], Shivang Shukla[3]	Analytical approaches for drug–excipient compatibility and their role in formulation development	93
104.	**INADDP/PT/ON/19-P**	Bhumi Agarwal [1], Prof . (Dr) Nanda Kishor Agarwal * Bal Krishna Singh	One pot synthesis of bioactive pyrazole derivatives using natural organic acid catalysts and evaluation of their anti-inflammatory potential	94
105.	**INADDP/PT/ON/20-P**	Sanket Gabhale[1], Karuna Nagula*	Systematic review on mangiferin formulation development for diabetes management	95
106.	**INADDP/PT/ON/21-P**	Shipra Yadav[1], Sunita Thakur*[2]	Nanotechnology-driven approaches to bioactive compound delivery: mechanisms, platforms, and translational potential	96
107.	**INADDP/PT/ON/22-P**	Divya Thakur[1], Neha Raghuwanshi[2]*	Interpenetrating polymeric network beads: an emerging platform for next-generation targeted drug delivery	97
108.	**INADDP/PT/ON/23-P**	Swarthi Kumari Dohare[1]*	Preparation and evaluation of cpx-cs-nanoparticles loaded microneedles for improved skin penetration and antimycotic effect	98

109.	**INADDP/PT/ON/24-P**	Prince Tiwari[1], Nimisha[2]*	Stimulus-activated and feedback-regulated rate-controlled drug delivery systems	99
110.	**INADDP/PT/ON/25-P**	Jayprakash Singh[1], Sunita Thakur[2]*,	Next-generation nanocarriers: advanced strategies for enhancing ocular retention and corneal permeation	99
111.	**INADDP/PT/ON/26-P**	Mohd Sameer Khan[1], Shasank Soni[2]*,	A review on ocular drug delivery systems challenges advances and novel approach	
112.	**INADDP/PT/ON/27-P**	Shivam Shukla[1], Dr. Poonam Parashar*	Nano-enabled artificial intelligence: a convergent approach to early diagnosis and precision therapy in pediatric congenital heart disease	101
113.	**INADDP/PT/ON/28-P**	Aman Yadav, Shashank Soni*	Smart drug delivery platforms for periodontal regeneration: current status and Emerging perspectives	102
114.	**INADDP/PT/ON/29-P**	Nainika Tiwari, Dr. Satya Prakash Singh	Synthesis and evaluation of dissolving microneedle patches for vaccine delivery	102
115.	**INADDP/PT/ON/30-P**	Ankit Chauhan[1], Satya Prakash Singh*	Recent advances in novel drug delivery system	103
116.	**INADDP/PT/ON/31-P**	Pramod Kumar Yadav[1], Vishakha Jaiswal*	Advancement in ocular drug delivery system	104

117.	**INADDP/PT/ON/32-P**	Nishant Sharma, Shashank Soni*	Nanosuspension-loaded hydrogels for controlled and targeted drug delivery: formulation strategies and characterization	105
118.	**INADDP/PT/ON/33-P**	Sabrina Alam, Narahari Narayan Palei	Pharmaceutical cocrystals: a novel crystal engineering approach for enhancing drug solubility and bioavailability	106
119.	**INADDP/PT/ON/34-P**	Pushker Singh Ruhela, Dr. Poonam Parashar*	"Next-generation nanoparticle-based nose-to-brain drug delivery: A novel strategy for targeted therapy of central nervous system disorders	107
120.	**INADDP/PT/ON/35-P**	Rudransh Ranjan[1], Shashank Soni2	Role of excipients in pharmaceutical formulation	108
121.	**INADDP/PT/ON/36-P**	Rishabh Singh[1], Nimisha*	Recent advances in ai-integrated smart polymers for controlled drug delivery and therapeutic applications	109
122.	**INADDP/PT/ON/37-P**	Yash Pandey, Shashank Soni*	Marine based nanotherapeutics in the management of rheumatoid arthritis: a review	110
123.	**INADDP/PT/ON/38-P**	Mr. Sayyed F Tahir, Dr. Karuna N Nagula*	Development of a sprayable nanohydrogel–integrated porous chitosan wafer for enhanced diabetic wound healing.	111
124.	**INADDP/PT/ON/39-P**	Abhishek Rajput, Neeraj Mishra*	Ai-enabled nanoinformatics for target nanocarrier co-design:an integrated platform for next generation drug discovery	111
125.	**INADDP/PT/OF/40-P**	Janhvi Maurya[1], Singh Shekhar Gautam[2]*	Mupirocin-loaded nanospanlastic topical gel for enhanced antibacterial therapy of bacterial skin infections	112
126.	**INADDP/PT/OF/41-P**	Abhishek Maurya[1], Amit Kumar Singh[2]*	Ethosomal gel: an approach for enhanced topical drug delivery	113
127.	**INADDP/PT/OF/42-P**	Rajnikant[1], Rashmi Keshri[2*], Payal Gupta[3], Payal Chaurasiya[4], Vivek Kumar[5]	Nanotechnology-based oral drug delivery systems	114

128.	**INADDP/PT/OF/43-P**	Ankita Yadav1, Prof. (Dr.) Shanti Bhushan Mishra2*	Cubosomes: a novel lipid-based nanocarrier for advanced drug delivery systems	114
129.	**INADDP/PT/OF/44-P**	Sumit Singh1, Prakhar Pandey2, Dr. Prakash Chandra Gupta3*	Beyond the ocular barriers: nanotechnology-enabled precision therapy for anterior and posterior segment disorders	115
130.	**INADDP/PT/OF/45-P**	Rajat Rathaur, Akansha Mishra, Shristi Yadav, Dr. Ajay Kumar Gupta*	Nanotechnology in parkinson's disease: novel aptroaches for targeted drug delivery	116
131.	**INADDP/PT/OF/46-P**	Supriya Prajapati, Amit Yadav*	Implantable drug delivery systems: current advances and future perspectives	117
132.	**INADDP/PT/OF/47-P**	Khushi Verma, Khushi Kumari, Md Kaish*, Divyash Singh	Critical analysis of demerits and translational limitations of stimuli-responsive nanogels in tptical scalp delivery for hair fall inhibition	118
133.	**INADDP/PT/OF/48-P**	Rashmi Keshri1, Payal Gupta2, Payal Chaurasiya3, Rajnikant4, Vivek Kumar5	Nano-phenotype fingerprinting for early cancer detection	119
134.	**INADDP/PT/OF/49-P**	Utpal Pandey1 Dr. Amit Kumar Singh2*	Solid lipid nanoparticles for topical drug delivery: a promising approach for enhanced skin penetration	120
135.	**INADDP/PT/OF/50-P**	Abhishek Pandit1, Dinesh Maurya2*, Ali Athar3	Nanoparticle- based targeted therapies for cancer	121
136.	**INADDP/PT/OF/51-P**	Payal Chaurasiya*, Rajnikant, Rashmi Keshri, Payal Gupta, Vivek Kumar	Smart nanocarriers for controlled drug delivery	122

137.	**INADDP/PT/OF/52-P**	Presenting Author Name - Amit Yadav	Tablet coating technology: principles, process and recent advances	122
138.	**INADDP/PT/OF/53-P**	Aditya Kumar[1], Dr. Priya Pathak	Ai-driven nanoparticle design for next-generation drug delivery	123
139.	**INADDP/PT/OF/54-P**	Piyush Gupta1, Nishi Singh2, Nidhi Yadav3, Md Kaish4*, Divyash Singh5	Ai-driven nanomedicine: integrating artificial intelligence with nanotechnology for next-generation drug discovery and delivery	124
140.	**INADDP/PT/OF/55-P**	Rahul Gupta1, Richa Srivastava1	Polymers in nanotechnology: smart materials driving innovation in drug delivery, diagnostics, and beyond	125
141.	**INADDP/PT/OF/56-P**	Mr. Sayyed F Tahir, Dr. Karuna N Nagula	Development of a sprayable nanohydrogel–integrated porous chitosan wafer for enhanced diabetic wound healing.	126
142.	**INADDP/PT/OF/57-P**	Ankush Yadav, Dr. Prateek Pandey*	Herbal phytosomal gel: a novel nanotechnology-based approach for accelerated wound healing	127
143.	**INADDP/PT/OF/58-P**	Pallavi[1], Richa Srivastava[1]*,	Nanotechnology in next-generation drug development	128
144.	**INADDP/PT/OF/59-P**	Kumari Jyoti, Suraj Singh Yadav*	Nanotechnology in surgery: the future of ultra – precise and minimally invasive surgery	128
145.	**INADDP/PT/OF/60-P**	Mala Yadav, Yatish Yadav*	Microneedle based transdermal drug delivery: a promising approach for rheumatoid arthritis therapy	129
146.	**INADDP/PT/OF/61-P**	Abhishek Pandit, Dinesh Maurya*, Ali Athar	Nanoparticle- based targeted therapies for cancer	130
147.	**INADDP/PT/OF/62-P**	Pratishtha Rawat[1], Dr. Richa Srivastava*	Harnessing bio adhesion for prolonged gastric retention: role of polymers in grdds	131

148.	**INADDP/PT/OF/63-P**	Akash Pal, Dr. Amit Kumar Singh*	Nanocrystal-based drug delivery systems: a promising approach for poorly soluble drugs	132
149.	**INADDP/PT/OF/64-P**	Naina Pathak[1], Dr. Shradhanjali Singh[2]*, Dr. Anil Kumar Singh[3]	Lipid-based nanoparticles as a potential delivery approach in the treatment of rheumatoid arthritis	133
150.	**INADDP/PT/OF/65-P**	Dolly Tripathi[1], Richa Srivastava1[2]	Floating microspheres as a platform for gastroretentive herbal therapeutics: formulation perspectives	134
151.	**INADDP/PT/OF/66-P**	Priyanka Vishwakarma[1], Niharika Srivastava[2*], Nibha Singh[3]	Nanotechnology-based brain-targeted drug delivery for neurodegenerative diseases: recent advances and future perspectives	135
152.	**INADDP/PT/OF/67-P**	Ms. Saloni Jaiswal	Redefining the pharmaceutical pipeline through artificial intelligence	136
153.	**INADDP/PT/ON/68-P**	Vishwajeet Maurya[1], Prateek Pandey[2]*	Nanotechnology-based approaches for enhanced wound healing	
154.	**INADDP/PT/OF/69-P**	Ayush Kumar[1], Sunita Thakur[2]	Neurocosmetics in psychodermatology: harnessing the brain– skin axis for next-generation precision skincare	138
155.	**INADDP/PT/OF/70-P**	Abdul Shadab[1], Usama Ahmad, Reshu Tiwari1*	Rewriting the mrna delivery map: albumin hitchhiking lipid nanoparticles for safer and smarter nanomedicine	139
156.	**INADDP/PT/OF/71-P**	Shams Imam[1], And Dr Reetu*	From advanced drug discovery to tissue regeneration: integrating nanotechnology for next generation precision therapeutics	139
157.	**INADDP/PT/OF/72-P**	Authors: Adiba Anees[1], Mohammad Javed Ansari*, Swati Sharma	Next-generation acne therapeutics: harnessing snedds as an advanced nanotechnology-enabled drug delivery platform	140

158.	**INADDP/PT/OF/73-P**	Salvi Singh, Richa Srivastava	Polymeric paradigms in formulation development: bridging material science and therapeutic innovation	141
159.	**INADDP/PT/OF/74-P**	Authors: Vivek Yadav[1], Abdul Hafeez*, Javed Akhtar Ansari	Smart transniosomal platforms in cutaneous malignancies: integrating edge activator dynamics for enhanced dermal penetration	142
160.	**INADDP/PT/OF/75-P**	Anamta Khan, Dr. Mohammad Shariq*, Prof. Tariq Mehmood, Dr. Farogh, Dr. Reshu Tiwari	Chronocosmetic nanotechnology for circadian rhythm-synchronized blue-light protection and prevention of digital skin aging	143
161.	**INADDP/PT/ON/76-P**	Mayank Pal[1], Dr Ramesh Kr. Gupta*	Nanoformulations for alzheimer's disease: overcoming the blood–brain barrier for targeted neuroprotection	
162.	**INADDP/PT/OF/77-P**	Kaustubh Shukla, Richa Srivastava*	Next-generation nanotechnology in drug delivery: smart systems for precision therapeutics	145
163.	**INADDP/PT/OF/78-P**	Ishita Pal, Richa Srivastava*	Nanotechnology in liver cancer therapy: a path toward smarter drug delivery	146
164.	**INADDP/PT/OF/79-P**	Tinkal[1], Vishakha Jaiswal*	Novel fucoidan: from marine sources to therapeutic frontiers	147
165.	**INADDP/PT/OF/80-P**	Mohil Mishra[1], Richa Srivastava	Smart nanostructures for prolonged gastric retention and controlled release	148
166.	**INADDP/PT/OF/81-P**	Aaddya Mishra[1], Dr Ramesh Kumar Gupta *[2]	Polymeric microparticles for pulmonary drug delivery	149

167.	**INADDP/PT/OF/82-P**	Janhvi Pal[1], Singh Shekhar Gautam[2]*	Development and characterization of a novel omeprazole-loaded chitosan-coated nanoemulgel with potential antimicrobial activity: in vitro and ex vivo evaluation	150
168.	**INADDP/PT/OF/83-P**	Rahul Ojha[1] And Ms.Chandani Nigam1*	Role of nanoparticles in combat antibacterial resistance: current progress, mechanisms, and future perspectives	150
169.	**INADDP/PT/OF/84-P**	Shalinee Yadav*	Transferosomes: a novel nanotechnology-based approach for enhance transdermal drug delivery	152
170.	**INADDP/PT/OF/85-P**	Jalesh Kahsyap[1], Neeraj Jain*	In silico-driven formulation optimization: machine learning frameworks for high-concentration monoclonal antibody (mab) biosimilars	152
171.	**INADDP/PT/OF/01**	Abhishek Yadav, Debabrata Chanda, Prasant Kumar Rout	Enrichment of gymnemic acids from gymnema sylvestre leaves and evaluation of vaxorelaxant activity	154
172.	**INADDP/PY/ON/02**	Ansari M Mohsin, Arti Gupta	Plant-based strategies for kidney disease management: mechanistic evaluation of zea mays stigma and citrullus lanatus seed extracts	155
173.	**INADDP/PY/OF/03**	Vaibhav Kumar, Richa Srivastava	Nanotechnology-enabled herbal therapeutics: arjuna and amla in cardiovascular disease management	156
174.	**INADDP/PY/OF/04**	Atul Yadav, Prashant Lawaniya, Pragati Rathore, Anurag Tiwari, Priyanka Prajapati	Role of dexamethasone in testicular toxicity and potential phytoconstituents-based protection	157
175.	**INADDP/PY/OF/05**	Balvant Singh	Phytochemical characterization and evaluation of the anti-inflammatory and antioxidant potential of azadirachta indica leaf extract	158
176.	**INADDP/PY/OF/06**	Dhvani Rafaliya, Aditya Singh	Enhancing therapeutic potential of phytochemicals through nanostructure lipid carrier-based delivery	159
177.	**INADDP/PY/OF/07**	Diptimayee Jena, Manish Kumar Gautam, Kirtimaya Mishra	Therapeutic potential of clerodendrum colebrookianum walp. Leaf extract in tnbs-induced colitis: evidence from disease activity, hematological and histopathological outcomes	160

178.	**INADDP/PY/OF/08**	Muskan Kushwaha	From phytochemical discovery to nano-therapeutics: exploring michelia champaca linn. For next-generation burn wound healing	162
179.	**INADDP/PY/OF/09**	Neelam Maurya, Shanti Bhushan Mishra	Probiotic-fermented plant bio-actives and their nano-formulation: a novel approach for diabetes management	163
180.	**INADDP/PY/OF/10**	Prashant Lawaniya, Atul Yadav, Pragati Rathore, Anurag Tiwari, Priyanka Prajapati	Phytoconstituents-based therapeutic approaches against reserpine-induced fibromyalgia: focus on oxidative stress and neuroinflammation	164
181.	**INADDP/PY/OF/11**	Mr. Salman Abdul Mobin, Poonam Pavan Nikam	Natural antioxidant phytochemicals genistein and diosgenin: mechanistic insights and therapeutic prospect	165
182.	**INADDP/PY/OF/12**	Satish Kumar Kushwaha, Dr Virendra Kumar Maurya, Mr Kamlesh Kumar	Evaluation of the hepatoprotective and antioxidant potential of bauhinia variegata flower extract against experimentally induced hepatotoxicity	166
183.	**INADDP/PT/OF/13**	Shabihul Hasan, Dr Virendra Kumar Maurya, Mr Kamlesh Kumar	Evaluation of the cardioprotective and antioxidant potential of nyctanthes arbor-tristis leaf extract against experimentally induced myocardial injury	167
184.	**INADDP/PY/OF/14**	Shubham Patel	Novel gallic acid derivatives as next-generation therapeutics: an integrated approach using advanced drag discovery and nanotechnology	168
185.	**INADDP/PY/OF/15**	Shubhendu Om Prakash Dash, Himanshu Bansode	Re-engineering berberine delivery through a mucoadhesive buccal film: a patient-centric platform for enhanced systemic antidiabetic therapy	169
186.	**INADDP/PY/ON/16**	Sonali Vishwakarma	From nature to nanomedicine: harnessing nanotechnology for next-generation herbal drug delivery	170
187.	**INADDP/PY/OF/17**	Archit Akhil[1,] Dr. Mohini Chaurasia[*1], Dr. Raj Kumar Tiwari*[2], Dr. Alok Tripathi*[3]	Stimuli-responsive phytochemical nanomedicine: a review on the synchronized co-delivery of endoperoxides and curcumin to overcome apoptotic resistance in tnbc	171

188.	**INADDP/PT/OF/18**	Surya Prakash, Dr Virendra Kumar Maurya, Mr Kamlesh Kumar	Mechanistic evaluation of a standardized bioactive fraction of sideritis bilgeriana in experimental inflammation: interplay between nrf2/ho-1 and nf-κb signaling	172
189.	**INADDP/PY/ON/19**	Swati Singh, Kapil Kumar, Divya Verma, Barsha Thapa, Debabrata Chanda, Arvind Singh Negi	Cancer epigenetics effect of curry leaf carbazole alkaloids	173
190.	**INADDP/PT/ON/20**	Vikrant Singh, Siva Prasad Panda	Caftaric acid as a multi-target phytochemical for diabetic retinal and peripheral neurovascular injury: molecular basis and therapeutic potential	174
191.	**INADDP/PT/ON/21**	Mr. Bhaskar	A review on pharmacological activities of bryophyllum pinnatum. Linn.	175
192.	**INADDP/PT/OF/22**	Khyati, Richa Srivastava	Nanotechnology approaches in modern therapeutics: advancing herbal drug delivery systems	176
193.	**INADDP/PT/OF/23**	Aloyna Chatterjee, Richa Srivastava	Unveiling herbal pathways in hepatic and cardiovascular protection through nanotechnology	177
194.	**INADDP/PT/OF/24**	Ansh Pandey, Rabiya Ahsan	Ai-driven nanocarrier design: a closed-loop framework for integrating computational drug discovery and precision drug delivery	178
195.	**INADDP/PT/OF/25**	Abhishek Yadav, Debabrata Chanda, Prasant Kumar Rout	Enrichment of gymnemic acids from gymnema sylvestre leaves and evaluation of vaxorelaxant activity	179
196.	**INADDP/PT/ON/26**	Diptimayee Jena, Manish Kumar Gautam, Kirtimaya Mishra	Therapeutic potential of clerodendrum colebrookianum walp. Leaf extract in tnbs-induced colitis: evidence from disease activity, hematological and histopathological outcomes	180
197.	**INADDP/PY/OF/27**	Himanshu Singh, Varsha Tiwari, Abhishek Tiwari	Recent advancements in tuberculosis therapy	181

198.	**INADDP/PY/ON/28**	Ayushi Singh, Lucy Mohapatra, Himani Awasthi	Neuroprotective potential of fermented ethanolic extract of dictyota bartayresiana by targeting gut-brain axis: an in-silico study	182
199.	**INADDP/PY/ON/29**	Aransha Maurya, Suyashi Mishra, Uma Shankar, Akshita Chakravarty, Shivani Sahu, Vaishali Sahu, Sudeep Tandon, Ram Swaroop Verma	Lallemantia royleana: a natural platform for next-generation therapeutics	183
200.	**INADDP/PY/OF/30**	Nivedita Chatterjee*1, Varsha Tiwari1, Abhishek Tiwari1, Manish Kumar2	Targeting the inflamed gut: emerging nanotechnologies for precision therapy of inflammatory bowel disease	184
201.	**INADDP/PC/OF/01**	Ashutoshh, Nishi Gupta	New heterocyclic scaffolds surpassing the limits of conventional antiulcer agents: a review	186
202.	**INADDP/PC/OF/02**	Pathan Faizankhan[1], Jagdish Kakadiya[1]*	Kidney-on-a-chip: a next-generation platform for modeling renal physiology and drug-induced nephrotoxicity	186
203.	**INADDP/PC/OF/03**	Shivangi, Akanksha Gupta*	Heterocyclic compound–nanoparticle hybrids: a promising strategy for antidiabetic drug development	187
204.	**INADDP/PC/OF/04**	Satyam Tiwari*, Nishi Gupta	Design, synthesis and in vitro evaluation of novel pyrazoline derivatives with potential antibacterial activity.	188
205.	**INADDP/PC/ON/01**	Shambhavi Shandilya[1], Abhishek Tiwari[1]*, Varsha Tiwari[1]	Zinc oxide nanoparticles in precision oncology: mechanisms, therapeutic applications, synthesis strategies, and translational perspectives	189

206.	**INADDP/PC/OF/05**	Km Shivani Sahu[1,2], Uma Shankar[1], Suyashi Mishra[1], Akshita Chakravarty[1], Aransha Maurya[1], Ram Swaroop Verma[1,2,*]	Gas chromatography-mass spectrometry analysis of volatile compounds in indian bluegrass (bothriochloa pertusa)	190
207.	**INADDP/PC/OF/06**	Suyashi Mishra[1,2], Aqib Sarfraz[3],	Fragrance mapping of 59 rose cultivars from india: linking the chemical diversity of scented and non-scented genotypes to olfactory receptor interaction	191
208.	**INADDP/PC/ON/02**	Mohd Arman[1], Ruchi Yadav[1*]	Integrative multi-omics analysis of genetic variants in copd and asthma using a python-based computational framework	192-193
209.	**INADDP/PC/ON/03**	Taiba Fatima[1], Ruchi Yadav[1*]	Ai-enabled computational identification and functional prediction of genetic variants in pulmonary fibrosis and interstitial lung disease	193-195
210.	**INADDP/PC/ON/04**	Ritwika Jaiswal[1], Amit Kumar Mishra[1*]	Next-generation ferulic acid derivatives for diabetic wound healing: from molecular design to proposed nanotechnology-based delivery	195-196
211.	**INADDP/PC/OF/07**	Neha Yadav[1]*	Harnesssing artificial intelligence for next- generation Anti- inflammatory drug discovery	196
212.	**INADDP/PC/ON/05**	Vivek B Patil[1*]	Integrated quality by design strategy for analytical and bioanalytical method development of anti-diabetic drugs optimization validation and application.	196-198
213.	**INADDP/PC/ON/06**	Vaishnavi Choudhary[1]*, Ravi Pratap Pulla[1]	Design and in-silico evaluation of novel isoxazole derivatives as potential hsp90 inhibitors for breast cancer	198
214.	**INADDP/PC/ON/07**	Sumit Sharma[1*], Ravi Pratap Pulla[1]	Computer-aided drug designing and molecular docking studies of coumarin derivatives as potential anti-diabetic agents	198-199
215.	**INADDP/PC/OF/08**	Alka Verma[1], Abhishek Tiwari[1]*, Varsha Tiwari[1]	Thiazole and its derivatives: advances in synthesis, pharmacological activities, and therapeutic applications	199-200

216.	**INADDP/PC/OF/09**	Ravi Kant[1], Akanksha Gupta[1*]	S-triazine derivatives as promising antimicrobial agents	200-201
217.	**INADDP/PC/OF/10**	Sanjay Kumar[1], Amit Kumar Mishra[1]*	Design, synthesis and evaluation of novel benzothiazole-based derivatives as next-generation oral anti-inflammatory agents using nanotechnology-based delivery	201-202
218.	**INADDP/PC/OF/11**	Rashmi[1], Sali Tiwari[1]	From obesity to cancer risk: nano-enabled natural product drug discovery through cadd-guided identification of pt1b inhibitors from barleria terminalis	202-203
219.	**INADDP/PC/ON/08**	Prakhar Pandey[1], Sumit Singh[1], Nisha Sharma[1], Anupriya Kapoor[1]*	Ai-driven spatial multi-omics and nanotechnology: a convergence for next-generation therapeutics	203-204
220.	**INADDP/PC/ON/09**	Saniya Khan[1], Komal Yadav[2]*	Next-generation therapeutics: integrating nanotechnnology with advanced drug discovery platforms	204-205
221.	**INADDP/PC/ON/10**	Shivam Pandey[1], Abhishek Tiwari[1]*, Varsha Tiwari[1]	Silver nanoparticles in precision oncology: mechanisms, therapeutic applications, synthesis strategies, and translational perspectives	205-206
222.	**INADDP/PC/OF/12**	Aakriti Tripathi[1], Abhishek Tiwari[2*], Varsha Tiwari[3]	Quinoline-based therapeutics: advances in synthesis, molecular targets, pharmacological activities, and emerging drug-discovery strategies	206-207
223.	**INADDP/PC/ON/11**	Monika Moitra[1], Ruchi Yadav*[1]	Immunoinformatics-guided design of a multi-epitope vaccine candidate targeting sorcin for gallbladder cancer	207-208
224.	**INADDP/PC/ON/12**	Neelima Shrivastava	Privileged heterocyclic scaffolds in next-generation anticancer drug discovery: from rational design to precision therapeutics	208-209

225.	**INADDP/PC/ON/13**	Karuna Nagula[1]*, Rudra Soni[2]	Medicinal mushrooms for anti-cancer activity	209-210
226.	**INADDP/PC/OF/13**	Mohammed Kashif Jamal*[1], Alok S. Tripathi[1]	Argeting kynurenine 3-monooxygenase with piperine: an integrated *in silico and in vitro* evaluation	210-211
227.	**INADDP/PC/OF/14**	Ansh Pandey[1], Rabiya Ahsan*[1]	Ai-driven closed-loop integration of computational drug discovery and precision nanocarrier engineering for next-generation therapeutics	211-212
228.	**INADDP/PC/ON/14**	Bhumi Agarwal [1], Nanda Kishor Agarwal *[1] , Bal Krishna Singh	One pot synthesis of bioactive pyrazole derivatives using natural organic acid catalysts and evaluation of their anti-inflammatory potential	212
229.	**INADDP/PC/OF/15**	Faisal Alam[1], Samar Mujeeb*[1]	Ai-driven prediction of nanoparticle toxicity and biodistribution: bridging a critical gap in next-generation nanomedicine	212-213
230.	**INADDP/PC/OF/16**	Harshita Shrivastav*[1]	Nanotechnology-enabled imidazole derivatives: an advanced approach to drug discovery and targeted therapeutics	213-214
231.	**INADDP/PC/ON/15**	Himanshu Rawal[1], Yukti Nautiyal*[1], Vineet Kumar Maurya[1]	*In-silico* pharmacokinetic and adme/tox analysis of phytochemicals from *hippophae* for their therapeutic potential	214-216
232.	**INADDP/PC/OF/17**	Nupur Jaiswal[1], Rahul K. Maurya*[1], Alok S. Tripathi[2]	From virtual screening to quantum chemical validation: an integrated computational strategy for discovering thiazole-based xanthine oxidase inhibitors	216-217

233.	**INADDP/PC/OF/18**	Rama Singh[1], Neha Mathur*[1]	From docking to assay: biological validation of optimized flavone leads in rheumatoid arthritis model	217-218
234.	**INADDP/PC/ON/16**	Ravi Pratap[1,2], Ramesh Chandra Dubey[3], Rahul Kumar Maurya*[1]	Computational and experimental characterization of fatty acid methyl esters in thermally processed indian rapeseed oil	218-219
235.	**INADDP/PC/OF/19**	Shambhavi Shandilya[1], Abhishek Tiwari*[1], Varsha Tiwari[1]	Zinc oxide nanoparticles in precision oncology: mechanisms, therapeutic applications, synthesis strategies, and translational perspectives	219-220
236.	**INADDP/PC/OF/20**	Vaishnavi Kaushal[1], Upama Surendra Singh*[1]	Demystifying the clinical black box: a systematic review of explainable ai (xai) frameworks in precision medicine	220-221
237.	**INADDP/PC/OF/21**	Vaishnavi Raghuvanshi [1], Zeeshan Fatima[*1]	Integration cadd, ai and pbpk modeling in drug discovery	221-222
238.	**INADDP/PC/ON/17**	Yukti Nautiyal[1], Himanshu Rawal*[1], Vineet Kumar Maurya[1]	*In-silico* evaluation of lactaroviolin analogues as potential pbp2a-targeting compounds against methicillin-resistant *staphylococcus aureus*	222-223
239.	**INADDP/PC/OF/22**	Shipra Bajpai[1], Ruchi Yadav*[1]	Mutation-aware structure-based discovery of flt3 inhibitors against resistance-associated variants in acute myeloid leukaemia	223-224
240.	**INADDP/PC/OF/23**	Vaishnavi Shukla*, Ramanpreet Walia1	Structure-based evaluation of novel tead3 inhibitors targeting the glu347-associated subpocket for precision cancer therapy	224-225
241.	**INADDP/PC/OF/24**	Vineeta Rawat[1], Aditya Soni[1,] Neha Mathur[1]	Doe-enabled forced degradation and stress mapping to define a stability-indicating design space for an API.	225-226

ABSTRACTS

Exploration of Natural-Product-Inspired Bioactive Alkaloids/Terpenes: Synthetic Strategies and Medicinal Applications

Sandeep Chaudhary*

Laboratory of Bioactive Heterocycles and Catalysis (BHC lab), Department of Medicinal Chemistry, National Institute of Pharmaceutical Education and Research-Raebareli (Transit Campus), Sarojini Nagar, Lucknow-226002, India.

E-mail: schaudhary.chy@niperraebareli.edu.in , sandeep.chaudhary2311@gmail.com

Nature is known as a reservoir for many biologically active natural products and provided many important drugs for numerous therapeutic applications. Almost 60% of all drugs are inspired from nature especially in the arenas of infectious diseases, cancer and neurodegenerative disorders. Along with this, bioactive alkaloids and terpenes had received tremendous attention over the past few decades and provided several leads/drug-like molecules.

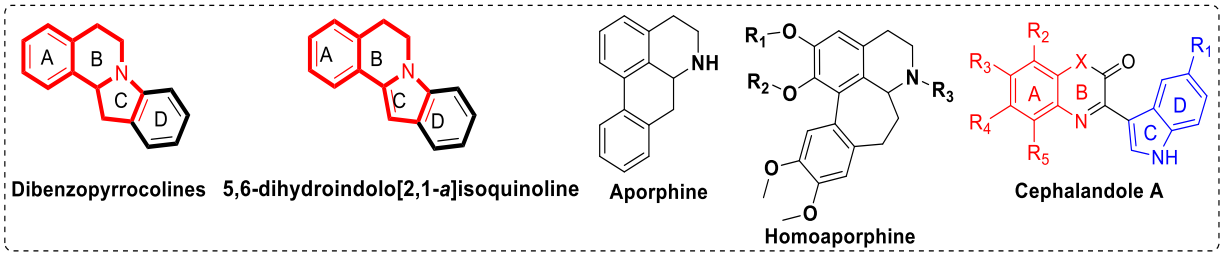


Figure 1: Structures of few natural-product-inspired bioactive alkaloids.

Our research programme had two major objectives: (a) to develop new biologically active new lead molecule effective against cancer and infectious diseases and (b) to develop efficient synthetic methodologies via utilizing C-H bond activation and basic organic chemistry knowledge. As part of this programme and in search for novel bioactive analogues, here, we will discuss about the chemistry, structure, stereochemistry, control experiments, probable mechanism and various applications. In particular, Dibenzopyrrocolines, 5,6-Dihydroindolo[2,1-*a*]isoquinoline, Aporphines, Homoaporphines, Cephalandole A, and antimalarial drug Artemisinin will be discussed in detail (Figure 1 and 2).

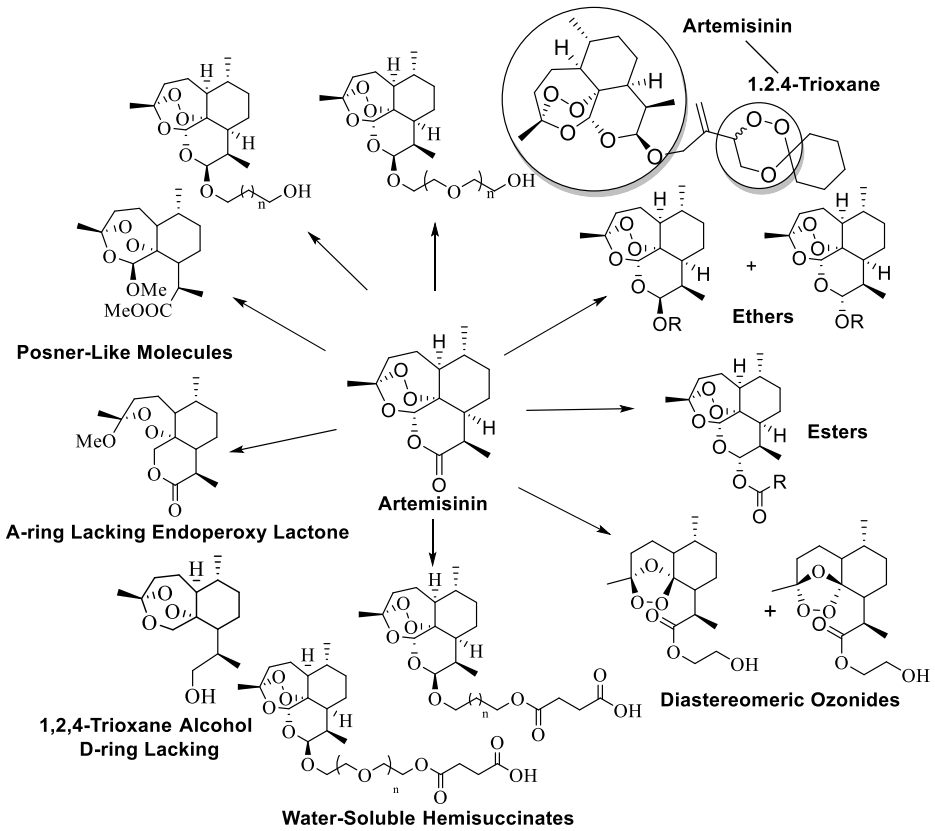


Figure 2: Structures of various derivatives and prototypes of Artemisinin prepared in our laboratory.

References

1. Yadav, L.; Shyamlal, B. R. K.; Tiwari, M. K.; Rahaman, A.T.A.; Sen, J.; **Chaudhary, S.*** *Chemistry-An Asian Journal*, **2022**, *17(16)*, e202200398.
2. Sharma, V.; Jaiswal, P. K.; Kumar, S.; Mathur, M.; Swami, A. K.; Yadav, D. K.; **Chaudhary, S.*** *ChemMedChem*, **2018**, *13(17)*, 1817-1832.
3. Shyamlal, B. R. K.; Kumar, V.; Gupta, A.; Ronin, R. S.; Mathur, M.; Yadav, D. K.; and **Chaudhary, S.*** *ACS Med. Chem. letters* **2024** (to be communicated soon).
4. Sahu, N. K.; Priyanka, Mahajan, A.T.; Sharma, V.; Suhas, K. P.; Tripathi, P.; Mathur, M.; Jain, M.;* **Chaudhary, S.*** *J. Mol. Struct*, **2023**, 137445.
5. **(a)** Ng, J. P. L.;† Tiwari M. K.;† Nasim A. A.; Zhang, R. L.; Qu Y.; Sharma, R.; Law, B. Y. K.; Yadav D. K.;* **Chaudhary S.***; Coghi P.*; Wong, V. K. W.* *Pharmaceuticals*, **2022**, *15*, 360. (b) Tiwari, M. K.;† Coghi, P.;† Agarwal, P.;† Yadav, D. K.; Yang, L. J.; Congling, Q.; Sahal, D.;* Wong, V. K.W.;* **Chaudhary, S.*** *Eur. J. Med. Chem.*, **2021**, *224*, 113685. (c) Tiwari, M. K.;† Coghi, P.;† Agarwal, P.;† Shyamlal, B. R. K.; Yang, L. J.; Yadav, L.; Peng, Y.; Sharma, R.; Yadav, D. K.; Sahal, D.; Wong, V.K.W.; **Chaudhary, S**.* *ChemMedChem.*, **2020**, *15*, 1216-1228. (d) Tiwari, M. K.; **Chaudhary, S.*** *Med Res Rev.*, **2020**, *40(4)*, 1220-1275. (e) Tiwari, M. K.; Yadav, D. K.; **Chaudhary, S.*** *Current Topics in Medicinal Chemistry*, **2019**, *19*, 852-864. (f) Yadav, D. K.; Kumar, S.; Teli, M. K.; Yadav, R. K.; and **Chaudhary, S.** *Current Topics in Medicinal Chemistry*, **2019**, *19*, 824-838. (g) Yadav, L.; Tiwari, M. K.; Shyamlal, B. R. K.; Mathur, M.; Swami, A. K.; Puri, S. K.; Naikade, N. K.; **Chaudhary, S.*** *RSC Advances*, **2016**, *6*, 23718-23725. (h) **Chaudhary, S.***; Naikade, N. K.; Tiwari, M. K.; Yadav, L.; Shyamlal, B. R. K.; and Puri, S. K. *Bioorg. Med. Chem. Lett.* **2016**, *26(6)*, 1536-1541. (i) **Chaudhary, S.***; Sharma, V.; Jaiswal, P. K.; Gaikwad, A. N.; Sinha, S. K.; Puri, S. K.; Sharon, A.; Maulik, P. R.; Chaturvedi, V. *Org. Lett.*, **2015,** *17 (20)*, 4948-4951. (j) Singh, C.; Kanchan, R.; **Chaudhary, S.** and Puri, S. K. *J. Med. Chem.* **2012**, *55(3)*, 1117-1126. (k) Singh, C.; **Chaudhary, S.**; and Puri, S. K. *Indian Patent*, **2012**, *Patent No.* **253045** A1 20120622 *(IN**2006**DE00391)*. (l) Singh, C.; **Chaudhary, S.**; and Puri, S. K. *Indian Patent*, **2010**, *Patent No.* A 20100326 *(IN **2004**DE00209)*.

(m) Singh, C.; **Chaudhary, S.**; and Puri, S. K. *Bioorg. Med. Chem. Lett.* **2008**, *18(4), 1436-1441.* (n) Singh, C.; **Chaudhary, S.**; Kanchan, R.; and Puri, S. K. *Org. Lett.* **2007**, *9 (21)*, 4327-4329. (o) Singh, C.; **Chaudhary, S.**; and Puri, S. K. *J. Med. Chem.* **2006**, *49 (24)*, 7227-7233. (p) **Chaudhary, S.**; Gaikwad, A. N.; Sinha, S.; Chaturvedi, V. Manju, Y. K. and Singh, C. *Med. Chem. Res.*, **2006**, *15* (*1/6*), 246-247. (q) **Chaudhary, S.**; Puri, S. K. and Singh, C. *Med. Chem. Res.*, **2004**, *12* (*6/7*), 362.

Pharmacology & allied branches

ISSN: 2584-2781

INADDP/PL/OF/01

PHYTOCHEMICAL PROFILING AND EVALUATION OF THE ANTIOXIDANT AND ANTI-ARTHRITIC POTENTIAL OF *CRASSULA OVATA* LEAF EXTRACT IN AN EXPERIMENTAL MODEL OF ARTHRITIS

Dinesh Kumar Gond [1], Dr Virendra Kumar Maurya[2]*, Kamlesh Kumar[3]

[1]*Department of Pharmacology, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh-221712, India*

[2]*Department of Pharmaceutical Chemistry, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

[3]*Department of Pharmacognosy, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

Email Id: *dkmau841895@gmail.com; judani.maza@gmail.com*

Abstract:

Arthritis is a chronic inflammatory disorder characterized by joint inflammation, pain, swelling, and functional impairment, with oxidative stress playing an important role in its progression. *Crassula ovata* is a medicinal plant containing various phytoconstituents that may contribute to antioxidant and anti-inflammatory activities. The present study was undertaken to investigate the phytochemical profile and evaluate the antioxidant and anti-arthritic potential of *Crassula ovata* leaf extract in an experimental model of arthritis. Authenticated leaves of *C. ovata* were collected, dried, powdered, and extracted using a suitable extraction method. Preliminary phytochemical screening was performed to identify major classes of phytoconstituents. The antioxidant potential of the extract was evaluated using appropriate in-vitro antioxidant assays, while anti-arthritic activity was assessed in an experimental model by evaluating paw/joint swelling and relevant biochemical parameters. Phytochemical investigation revealed the presence of several bioactive constituents, while the extract demonstrated appreciable antioxidant activity. Treatment with the extract also showed a reduction in arthritis-associated inflammation and paw/joint swelling compared with the arthritic control group. The findings suggest that *C. ovata* leaf extract possesses promising antioxidant and anti-arthritic potential, which may be attributed to its phytochemical constituents. Further investigations are warranted to identify the active constituents and elucidate the underlying mechanisms of action.

Keywords: *Crassula ovata, Phytochemicals, Antioxidant, Anti-arthritic, Arthritis, Oxidative stress*.

INADDP/PL/OF/02

MECHANISTIC EVALUATION OF

ISSN: 2584-2781

THE ANTI-INFLAMMATORY AND ANTIOXIDANT POTENTIAL OF *AZADIRACHTA INDICA* LEAF EXTRACT IN EXPERIMENTAL INFLAMMATION

Rudransh Maurya [1], Dr Virendra Kumar Maurya[2]*, Kamlesh Kumar[3]

[1] *Department of Pharmacology, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

[2] *Department of Pharmaceutical Chemistry, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

[3] *Department of Pharmacognosy, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

***Email Id*:** manojrudransh@gmail.com, judani.maza@gmail.com

Abstract:

Inflammation is a complex biological response associated with tissue injury, oxidative stress, and the release of inflammatory mediators. *Azadirachta indica (neem)* is a medicinal plant traditionally recognized for its diverse pharmacological properties, including antioxidant and anti-inflammatory effects. The present study was undertaken to evaluate the anti-inflammatory and antioxidant potential of *Azadirachta indica* leaf extract and to explore its possible mechanisms of action in experimental inflammation.

Authenticated leaves of *A. indica* were collected, dried, powdered, and extracted using a suitable extraction procedure.

Preliminary phytochemical screening was performed to identify major classes of bioactive constituents. The antioxidant potential of the extract was evaluated using appropriate in-vitro antioxidant assays, while anti-inflammatory activity was investigated in an experimental model of inflammation by assessing changes in paw edema and relevant biochemical parameters. The extract demonstrated the presence of several phytochemical constituents and exhibited appreciable antioxidant activity. Treatment with the extract produced a reduction in inflammation-associated paw edema and showed improvement in selected biochemical parameters compared with the inflammatory control group. The observed effects suggest that the anti-inflammatory activity of *A. indica* leaf extract may be associated with its antioxidant potential and modulation of inflammatory processes. The findings support further investigation of *A. indica* as a potential natural source of bioactive compounds for managing inflammatory conditions.

Keywords: *Azadirachta indica; Anti-inflammatory; Antioxidant; Inflammation; Oxidative stress; Phytochemicals.*

ISSN: 2584-2781

INADDP/PL/OF/03

INTEGRATING STIMULI-RESPONSIVE NANOTECHNOLOGY WITH ADVANCED DRUG DISCOVERY PLATFORMS FOR INTRAVENOUS INHIBITION OF MYOCARDIAL INFARCTION

Vipin Tiwari[1], Md Kaish[1*] Divyash Singh[1]
[1]*Department of Pharmacology, Himalayan Institute of Pharmacy & Research, BKT, Lucknow, U.P., India*
Email Id: *mdkaish123786@gmail.com*

Abstract:

Myocardial infarction (MI) remains a major global health burden, primarily resulting from prolonged coronary artery occlusion, ischemic injury, oxidative stress, inflammation, and subsequent cardiomyocyte death. Despite advances in reperfusion therapy and pharmacological management, systemic administration of therapeutic agents is often limited by poor bioavailability, rapid clearance, nonspecific distribution, and inadequate drug concentrations at the infarcted myocardium. The integration of stimuli-responsive nanotechnology with advanced drug discovery platforms represents a promising strategy for developing targeted intravenous interventions against MI. Stimuli-responsive nanocarriers can be engineered to recognize pathological microenvironmental changes associated with myocardial ischemia, including altered pH, elevated reactive oxygen species (ROS), hypoxia, and inflammatory signals. These nanosystems can facilitate selective drug accumulation and controlled release at the site of myocardial injury while minimizing systemic exposure and off-target effects.

Furthermore, artificial intelligence (AI)-assisted drug discovery, structure-based screening, molecular docking, and high-throughput screening can accelerate the identification and optimization of cardioprotective molecules and drug combinations. Integration of these approaches may enable the development of multifunctional nanoplatforms capable of delivering antioxidants, anti-inflammatory agents, anti-apoptotic compounds, or regenerative therapeutics directly to the injured myocardium. Such systems could potentially reduce infarct size, suppress oxidative and inflammatory damage, preserve mitochondrial and endothelial function, and improve post-MI cardiac remodeling. The convergence of advanced drug discovery and stimuli-responsive nanotechnology therefore offers a transformative framework for precision cardiovascular therapy. However, challenges related to nanoparticle stability, scalability, long-term safety, biodistribution, immunogenicity, and regulatory translation must be addressed before clinical application. Overall, this integrated approach has significant potential to establish next-generation

ISSN: 2584-2781

intravenous nanotherapeutics for targeted prevention and treatment of myocardial infarction.

Keywords: *Myocardial infarction; Stimuli-responsive nanotechnology; Intravenous drug delivery; Artificial intelligence; Targeted therapy*.

INADDP/PL/ON/04

ARTIFICIAL INTELLIGENCE AND NANOTECHNOLOGY: INTEGRATING COMPUTER-AIDED DRUG DESIGN FOR THE DISCOVERY OF NOVEL ANTIHYPERTENSIVE THERAPEUTICS

Tarul Patel[1], Salil Tiwari*[1]
[1]*Department of Pharmaceutical Chemistry, Goel Institute of Pharmacy and Sciences, Lucknow, Uttar Pradesh, India*
Email Id: *s.salil21@gmail.com*

Abstract:

Hypertension is one of the widespread chronic disorders worldwide and remains a large risk factor for cardiovascular, cerebrovascular, and renal diseases. Although various antihypertensive drugs are available, limitations such as poor patient response, adverse effects, and reduced bioavailability spotlight the need for enhanced therapeutic approaches. Recent advances in artificial intelligence (AI), nanotechnology, and computer-aided drug design (CADD) offer promising opportunities to control some of these challenges. AI-assisted CADD can help the identification and optimization of possible antihypertensive molecules through techniques such as virtual screening, QSAR analysis, molecular dynamics simulation, molecular docking, and ADMET prediction. These computational

approaches can assist researchers understand drug–target interactions and prioritize favourable compounds before experimental evaluation. At the same time, nanotechnology-based drug delivery systems such as nanoparticles, liposomes, polymeric nanoparticles, and nanostructured lipid carriers can improve drug solubility, stability, bioavailability, controlled release, and targeted delivery. Combining AI-driven CADD with nanotechnology may therefore provide a more efficient strategy for discovering and delivering novel antihypertensive agents. This review discusses the emerging role of this integrated approach in antihypertensive drug discovery and highlights its potential to accelerate lead identification, improve therapeutic performance, and contribute to the development of safer and more effective next-generation treatments for hypertension.

Keywords: *Artificial intelligence; CADD; Nanotechnology; Hypertension; Molecular docking; Drug discovery.*

ISSN: 2584-2781

INADDP/PL/OF/05

ACK1/TNK2 SIGNALING IN CANCER: A MOLECULAR FRAMEWORK AND PRECISION THERAPEUTICS

Shruti Patel[1], Vivek Shrivastava[1]*
[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh, India-226028*
Email Id: *vsrivastava1@lko.amity.edu*

Abstract:

The disruption of tyrosine kinase signaling impairs cellular equilibrium, fostering oncogenesis. Among these, the non-receptor tyrosine kinase ACK1 (also designated as TNK2 or activated Cdc42-associated kinase 1) has been identified as a critical oncogenic driver that illustrates novel pathways in tumor growth. While foundational research primarily highlighted ACK1 as a cytosolic mediator that translocate between the cytoplasm and the nucleus to relay signals downstream of activated receptor tyrosine kinases (RTKs), modern findings demonstrate its additional role in epigenetic modulation. While ACK1 represents a compelling therapeutic target, its clinical development has faced obstacles due to poorly understood signaling dynamics and a historical shortage of selective inhibitors. Here, we outline modern insights into ACK1 regulation—including its capacity to modulate T-cell activation—and summarize preclinical assessments of candidate small-molecule inhibitors poised for oncology trials. ACK1 plays a major role in driving drug-resistant prostate cancer by directly modifying the androgen receptor, enabling tumors to keep growing despite hormone therapies. Beyond prostate cancer, modern gene sequencing shows that mutations and amplifications of the ACK1 gene are

common in many types of tumors, helping trigger cancer development in the first place. This review explores how ACK1 functions—including a newly discovered role in gene regulation (epigenetics)—which allows cancer cells to bypass traditional survival roadblocks and shrug off standard treatments. Because cancer cells frequently grow dependent on ACK1 to survive under harsh conditions like DNA damage or starvation, researchers are actively developing selective ACK1 inhibitors, bringing us closer to new targeted treatments for hard-to-treat cancers.

Keywords: *ACK1; T-cells; TNK2; Cancer; Epigenetics; Immune modulation; Kinase inhibitors.*

INADDP/PL/OF/06

NANOTECHNOLOGY-ENABLED THERAPEUTIC STRATEGIES FOR AMYOTROPHIC LATERAL SCLEROSIS: BRIDGING MOLECULAR PATHOGENESIS

ISSN: 2584-2781

AND ADVANCED DRUG DELIVERY

Sakshi Shukla[1], Dr. Ramesh Kumar Gupta[1*]

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Uttar Pradesh, Lucknow Campus, India-226028*

Email Id: *rkgupta@lko.amity.edu*

Abstract:

Amyotrophic lateral sclerosis (ALS) is aprogressive neurodegenerative disorder characterized by the degeneration of upper and lower motor neurons, resulting in progressive muscle weakness and loss of motor function. The complex and multifactorial pathogenesis of ALS involves genetic abnormalities, abnormal RNA processing, protein misfolding and aggregation, mitochondrial dysfunction, oxidative stress, neuroinflammation, impaired proteostasis, and excitotoxicity. These interconnected mechanisms create substantial challenges for the development of effective disease-modifying therapies. Although advances in molecular biology and drug discovery have identified several potential therapeutic targets, limited drug penetration into the central nervous system remains a major obstacle, with the blood–brain barrier and blood–spinal cord barrier restricting therapeutic exposure. Conventional pharmacological approaches provide limited benefits and may not adequately address the diverse pathological mechanisms involved in ALS. Nanocarriers may enhance drug stability, bioavailability, controlled release, cellular targeting, and transport across biological barriers. These platforms also offer opportunities for delivering small molecules, nucleic-acid-based therapeutics, and combination therapies directed toward specific molecular pathways. This poster highlights the molecular pathogenesis of ALS, major clinical manifestations, current therapeutic approaches, and emerging nanotechnology-enabled strategies for targeted CNS drug delivery. Despite promising preclinical evidence, challenges related to nanomaterial safety, biological compatibility, reproducibility, scalability, and clinical translation remain. Continued integration of molecularly targeted drug discovery with rational nanocarrier design may provide a promising route toward more effective and personalized therapeutic strategies for ALS.

Keywords: *Amyotrophic Lateral Sclerosis; Nanotechnology; Drug Delivery; Advanced Drug Discovery; Targeted Therapy; Neurodegeneration*

INADDP/PL/ON/07

ANTIRETROVIRAL PRODRUGS FOR IMPROVED ACQUIRED IMMUNODEFICIENCY SYNDROME THERAPY

Milind Shinde[1,2], Suneela Dhaneshwar*[1]

ISSN: 2584-2781

[1]*Amity Institute of Pharmacy, Amity University Maharashtra, Mumbai-Pune Expressway, Bhatan, PO-Somathane, Panvel, Mumbai-410206, Maharashtra, India*
[2]*Prof. Ravindra Nikam College of Pharmacy, Morane-Gondur Bypass Road, Gondur, Dhule-424002, Maharashtra, India*
Email Id: *suneelad@mum.amity.edu*

Abstract:

Acquired Immunodeficiency Syndrome (AIDS) represents one of the most significant global health challenges despite breakthrough advancements in antiretroviral therapy over the past two decades. With approximately 40.8 million people living with HIV globally and 630,000 annual deaths from HIV-related causes, the need for improved treatment strategies remains critical. While combination antiretroviral therapy has reduced mortality, persistent challenges, including drug resistance, poor bioavailability, limited tissue penetration, and patient adherence issues, continue to hinder therapeutic outcomes. Prodrug strategy has been widely used to improve the pharmaceutical, pharmacokinetic and pharmacodynamic drawbacks of antiviral drugs at large and antiretroviral drugs in particular. Present review examines primary prodrug strategies for antiretroviral drugs. Ester prodrugs that enhance membrane permeability through increased lipophilicity, phosphate prodrugs that dramatically improve aqueous solubility for poorly soluble compounds, amide acid prodrugs that circumvent efflux transporters and enhance absorption, long-acting nanoformulated prodrugs enabling monthly to potentially yearly dosing, and peptide prodrugs that utilize peptide transporter-mediated uptake to overcome cellular barriers. Notable examples include myristoylated and palmitoylated nucleoside analogs such as abacavir and emtricitabine, which demonstrate superior antiretroviral potency and reduced resistance profiles compared to parent drugs. Cutting-edge long-acting formulations of cabotegravir, dolutegravir, and darunavir prodrugs can sustain therapeutic plasma concentrations for extended periods following single intramuscular injections, potentially revolutionizing adherence and treatment accessibility. Together, these prodrug strategies address fundamental biopharmaceutical challenges in HIV pharmacotherapy.

Key words: *Bioreversible derivatives; HIV; Retrovirus; Reverse transcriptase inhibitors; Protease Inhibitors; Integrase inhibitors.*

INADDP/PL/ON/08

IN-VITRO ANTIOXIDANT AND ANTIDIABETIC ACTIVITY OF SHATAVARIN-ENCAPSULATED SAPONINOSOMES FROM *ASPARAGUS RACEMOSUS*

ISSN: 2584-2781

Rajni Mishra[*1], Dr Ashish Singhai[1], Dr Mukesh Singh Sikarwar[2]
[1]*Department of Pharmacognosy, Teerthanker Mahaveer College of Pharmacy, Teerthanker Mahaveer University, Moradabad (U.P.), India*
[2]*Department of Pharmacognosy, Amity Institute of Pharmacy, Amity University, Gwalior (M.P.), India*
Email Id: misra10785@gmail.com

Abstract:

Diabetes mellitus (DM) is one of the most common metabolic illnesses, characterized by chronic hyperglycemia and significant long-term consequences. Although various synthetic antidiabetic medications are available, but their long-term usage is generally limited by unpleasant effects, high costs, and poor patient compliance. Medicinal plants have attracted growing attention as safer alternatives; yet, their therapeutic potential is typically limited by poor solubility, low bioavailability, and unstable phytoconstituents. Nanotechnology-based drug delivery systems provide a viable solution to these limitations by increasing the bioavailability and therapeutic efficacy of herbal medications. The current study aimed to assess saponinosomes synthesized by hydroalcoholic root extract from *Asparagus racemosus* for increased antidiabetic action. The Saponinosomes demonstrated strong antioxidant activity, as evidenced by their effective inhibition in DPPH and SOD assay. A single intraperitoneal injection of STZ (60 mg/kg) was administered to the experimental animal to achieve the desired effect. The Wistar albino rats were divided into five groups: normal control, diabetic control, Standard treated gliclazide (4 mg/kg) and Test treated Saponinosomes (200 mg/kg). The rats were observed for 21 days to measure their body weight (BW) and blood glucose levels. The STZ-treated diabetic rats exhibited a significant rise in blood glucose levels and a consequent decrease in body weight. The study involved administering Saponinosomes from *Asparagus racemosus* (200 mg/kg) and gliclazide (4 mg/kg), orally to rats for a period of 21 days. The results indicated a substantial decrease in blood glucose levels and an increase in body weight compared to both the control group and the group treated with gliclazide. The study revealed that the Saponinosomes from *Asparagus racemosus* hydro-alcoholic extract had a strong antidiabetic effect.

Keywords: *Diabetes mellitus; Saponinosomes; Gliclazide; Blood glucose; Streptozotocin*

INADDP/PL/ON/09

BREAKING THE HEPATIC BARRIER: ADVANCED PHARMACEUTICAL ARCHITECTURES FOR TARGETED DELIVERY TO LIVER

ISSN: 2584-2781

Ragini Tandle[1], Suneela Dhaneshwar[1]*
[1]*Amity Institute of Pharmacy, Amity University Maharashtra, Mumbai, Maharashtra, India*
Email Id: *ngtinaddp26@gmail.com*

Abstract:

Liver diseases such as liver cirrhosis, viral hepatitis and hepatocellular carcinoma (HCC) are global health problems accounting for approximately 800 million cases and lead to over 2 million deaths per year worldwide. Mortality rate due to liver diseases consistently increased within the past twenty years from 3% to 3.5% of worldwide. The dysfunctions remain challenged due to disease heterogeneity, poor drug accumulation at the cellular site associated with conventional drug administration. Modern therapeutics aim to achieve selective drug delivery to hepatic cells, enhance therapeutic efficacy, minimize systemic exposure and overcome challenges related to targeting specificity, toxicity, biological barriers, scalability, and clinical translation. Passive targeting exploits the unique hepatic vasculature and reticuloendothelial system, whereas active targeting utilizes specific ligand–receptor interactions to facilitate selective delivery to hepatic cells. Exosomes, biomimetics and polymeric nanoparticles have demonstrated potential for improving drug bioavailability and cellular uptake. Cell-specific strategies involving hepatocytes, hepatic stellate cells, Kupffer cells and liver sinusoidal endothelial cells further enhance therapeutic precision. The development of modern pharmaceuticals represents a promising pathway for effective cell-specific treatment in the increasing importance of molecular interventions including RNA interference have expanded the scope of liver-directed therapy. Present work discusses on existing liver-targeted molecular approaches, with a special focus on recently approved therapeutics for deeper insight into their biological mechanisms of passive and active targeting, carrier-mediated delivery, nanotechnology-based systems and molecular approaches.

Keywords: *Liver-specific therapies; liver diseases; hepatic stellate cells; biomimetics; hepatocytes; nonspecific toxicity.*

INADDP/PL/OF/10

EMERGING THERAPEUTIC STRATEGIES FOR OPTIC NERVE DEGENERATION

Pushpa Kumari[1], Dr. Vivek Srivastava[1]*

[1]*Department of Pharmacology, Amity institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh, India-226028*

Emai Id: *vsrivastava1@lko.amity.edu.*

Abstract:

Optic nerve degeneration is progressive condition in which axons and retinal ganglion become damage gradually and

ISSN: 2584-2781

impaired transmission of visual information, loss of vision and the central nervous system has limited ability to regenerate damaged neurons the repairing of neuronal damage is difficult. Neuroprotective medications, gene therapy, stem cell-based therapies, neurotrophic factors, modulation of inflammatory processes, therapies targeting mitochondrial dysfunction, and enhanced drug-delivery systems are some of the potential approaches under investigation. These tactics seek to protect RGCs, reduce cellular stress, enhance mitochondrial function, and promote axonal repair. By enabling medicinal substances to more effectively and selectively target ocular tissues, nanotechnology may further enhance treatment. These pioneering investigations demonstrated that, in some intrinsic and extrinsic circumstances, RGCs have some capacity for regeneration. Importantly, reinnervation of brain targets and the restoration of functional synapses are necessary for meaningful vision restoration; axon regeneration alone is insufficient for functional recovery Even while experimental studies have shown promising results, there are still a number of issues that need to be resolved, especially with regard to therapeutic safety, targeted distribution, long-term efficacy, and the transfer of data from preclinical models to human clinical trials. Future studies that combine several therapy modalities and customize treatments for each patient may offer improved chances for preserving eyesight and enhancing functional recovery in optic nerve degeneration patients and the future perspective is combine therapies targeting multiple pathways.

Keywords: *Therapeutics strategies; Optic nerve; Degeneration; Neuroprotective medication; Nanotechnology based delivery.*

INADDP/PL/OF/11

SUSTAINABLE NANO-CARRIER FOR TREATING POST-MENOPAUSAL METABOLIC AND BONE DISORDERS

Manorma Patel[1], Dr. Ramesh Kumar Gupta[1]*

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh, India- 226028*

Email Id: *manorma.patel@s.amity.edu*

Abstract:

Post-menopausal women experience a significant dual health burden involving metabolic disorders-such as obesity, insulin resistance, dyslipidaemia, metabolic syndrome and progressive bone deterioration, particularly osteoporosis. These conditions are largely driven by oestrogen deficiency and endocrine imbalance after menopause that lead to increased morbidity, reduced quality of life, and rising healthcare costs worldwide. Conventional therapies, including hormone replacement therapy,

ISSN: 2584-2781

bisphosphonates, and iron or calcium supplements, often show limited long-term efficacy due to poor bioavailability, lack of tissue specificity, gastrointestinal instability, and systemic adverse effects. Nanocarrier-based drug delivery systems offer a promising strategy to address these limitations by enhancing drug stability, absorption, targeted delivery, and controlled release. Lipid-based nanoparticles, biodegradable polymeric nanospheres, dendrimers, and nano-engineered delivery systems have demonstrated improved therapeutic outcomes in both metabolic and bone disorder models. In osteoporosis management, bone-targeted nanocarriers and nano-enabled bone grafts exhibit enhanced bone accumulation, osteoconductivity, and mechanical strength. Similarly, nanonization and encapsulation approaches improve the bioavailability of iron, calcium, nutraceuticals, and metabolic modulators, supporting better management of post-menopausal metabolic dysfunction and anaemia. Incorporating sustainability into nanomedicine through biodegradable and green-synthesised materials such as chitosan, starch, lignin, and polylactide-based polymers further improves biocompatibility while reducing environmental and toxicological concerns. Sustainable nanocarriers therefore represent a targeted, safe, and environmentally responsible therapeutic approach for integrated management of post-menopausal metabolic and bone disorders.

Keywords: *Post-menopausal, health; Sustainable nanocarriers; metabolic disorders; Osteoporosis; Targeted drug delivery*

INADDP/PL/OF/12

EVOLUTION OF ANTI-ANXIETY POTENTIAL OF *LUFFA CYLINDRICA* FLOWER EXTRACT: A REVIEW

*Ankit Yadav[1], Dr. Sunil Kumar Singh[1]**

[1]Department of Pharmacology, United Institute of Pharmacy, Naini, Prayagraj, Uttar Pradesh, India- 211010

Email Id: *newidankityadav@gmail.com*

Abstract:

Anxiety disorders are among the most common mental health conditions and are characterized by persistent fear, worry, psychological distress and associated physiological changes. Limitations and adverse effects associated with conventional anxiolytic therapy have increased interest in medicinal plants as potential sources of safer therapeutic agents. Luffa cylindrica (Cucurbitaceae), commonly known as sponge gourd, is traditionally valued for its diverse medicinal properties and contains several bioactive phytoconstituents, including flavonoids, phenolics, alkaloids, saponins, triterpenoids and other antioxidant compounds. The present review focuses on the potential anti-anxiety activity of Luffa cylindrica, with particular emphasis

ISSN: 2584-2781

on its flowers. Available literature suggests that Luffa species possess neuropharmacological and antioxidant properties. Studies involving Luffa aegyptiaca and other Luffa preparations have reported reductions in anxiety-like behavioural responses in experimental models. Additionally, Luffa cylindrica has been reported to contain antioxidant constituents such as p-coumaric acid, feruloyl-glucose, caffeoyl-glucose, diosmetin, apigenin and luteolin derivatives. Flavonoids are particularly relevant because their reported effects on GABAergic and other neurotransmitter systems may contribute to anxiolytic activity. Their antioxidant properties may additionally help reduce oxidative stress associated with neurological dysfunction. Despite promising evidence, existing research has predominantly examined fruits, leaves and other plant parts, while specific evidence concerning Luffa cylindrica flower extract and its anti-anxiety potential remains limited. Therefore, systematic pharmacological and phytochemical investigation of the flowers may provide valuable evidence for their possible development as a natural anxiolytic resource.

Keywords: *Luffa cylindrica;* Flower extract; Anxiety; Anxiolytic; Flavonoids; Phytoconstituents; Oxidative stress.

INADDP/PL/OF/13

BIOSIMILARS: BRIDGING INNOVATION AND AFFORDABLE HEALTHCARE- GLOBAL REGULATORY EVOLUTION, MARKET ACCESS AND INDIA'S EMERGING ROLE

[1]*Chandra Shekhar Mishra**
[1]*Department of Pharmacology, Mahatma Gandhi Institute of Pharmacy (MGIP) Lucknow, Uttar Pradesh, India.*
Email Id: *csmishraofficial@gmail.com*

Abstract:

Biologic medicines are essential for treating severe conditions like cancer and autoimmune diseases, but their high production costs often prevent patients from accessing life-saving care. Biosimilars provide a much-needed solution by offering highly similar, cost-effective alternatives once the patent on an original biologic medicine expires. Unlike standard generic drugs, which are exact chemical copies, biosimilars are complex molecules made from living cells. Therefore, they must undergo rigorous testing—including structural, functional, and clinical evaluations—to prove they have no clinically meaningful differences in safety or efficacy compared to the reference medicine. This presentation highlights the critical role biosimilars play in reducing healthcare costs, enhancing market competition, and expanding patient access to advanced therapies globally. It explores the evolving regulatory frameworks across major bodies like the FDA, EMA, WHO, and India's CDSCO, while addressing ongoing

ISSN: 2584-2781

challenges such as manufacturing complexities, strict cold-chain requirements, pharmacovigilance, and the need to build trust among healthcare providers. Finally, the review focuses on India's strategic position in this landscape. With its robust manufacturing capabilities, skilled scientific workforce, and cost-efficient production, India has a unique opportunity to evolve into a globally trusted hub for high-quality biosimilars, ultimately ensuring that modern biologic treatments reach everyone who needs them.

Keywords: *Biosimilars; Healthcare Access; Biologics; Regulatory Science; Pharmacovigilance; Indian Pharmaceutical Industry.*

INADDP/PL/ON/14

TARGETING THE FOLATE PATHWAY IN CARDIOVASCULAR COMPLICATIONS: EMERGING NANOTHERAPEUTICS AND ADVANCED DRUG DISCOVERY APPROACHES

Aimen Salman[1], Tarique Mahmood[1]*, Rufaida Wasim[1]

[1]*Department of Pharmacy, Integral University, Dasauli, Kursi Road, Lucknow, U.P., India- 226026*

Email Id: *aimen.salman05@gmail.com*

Abstract:

Cardiovascular disease (CVD) is the leading cause of death globally, and emerging evidence indicates that micronutrient metabolism, especially the folate pathway, is involved in cardiovascular health and disease progression. Folate is important in preserving endothelial function, controlling homocysteine metabolism and cellular methylation. Disruption of these processes and increased homocysteine levels may contribute to oxidative stress, endothelial dysfunction, vascular remodelling, and progression of atherosclerosis. Although clinical trials and meta-analyses have been inconsistent in reporting cardiovascular benefits of folate supplementation, some randomised controlled trials have reported possible reductions in stroke and improvements in cardiovascular risk factors, suggesting the importance of individual genetic and metabolic characteristics. Recent advances in pharmacogenomics and drug discovery have revealed opportunities for developing targeted approaches to modulate the folate–homocysteine pathway. In this respect, nanotechnology-based delivery systems for drugs provide promising strategies to improve the stability, bioavailability, targeted delivery and therapeutic efficacy of folate-based interventions. Nanocarriers may provide additional opportunities for the controlled or co-delivery of folate pathway modulators with antioxidant and cardioprotective agents. Emerging evidence also suggests that the gut microbiome might modulate folate metabolism and therapeutic response. The

ISSN: 2584-2781

merging of nanotechnology, pharmacogenomics, biomarker discovery, microbiome research and advanced drug discovery platforms may allow the development of personalised next-generation therapeutics for folate-related cardiovascular complications. Future studies should address biomarker identification, microbiome-folate interactions, optimised nanocarrier systems, and patient-specific therapeutic formulations.

Keywords: *Folate pathway; cardiovascular disease; Nanotechnology; Advanced drug delivery; Pharmacogenomics.*

INADDP/PL/ON/15

FROM DYSBIOSIS TO GUT HOMEOSTASIS: THE EMERGING ROLE OF MULTI-STRAIN PROBIOTICS IN IRRITABLE BOWEL SYNDROME

Anjana Yadav[1,2], Suneela Dhaneshwar[1*]

[1]*Amity Institute of Pharmacy, Amity University Mumbai, Bhatan, Post-Somathne, Panvel, Mumbai- 410206 (M.S), India*

[2]*Medical Affairs, Samarth Life Sciences, Mumbai, Maharashtra, India*

Email Id: *suneelad@mum.amity.edu*

Abstract:

Irritable bowel syndrome (IBS) is a chronic disorder of gut-brain interaction affecting a substantial proportion of the global population and imposing considerable impairment of quality of life and healthcare costs. Because gut microbiota dysbiosis, characterized by reduced diversity, an altered *Firmicutes* to *Bacteroidetes* ratio, and depletion of beneficial taxa, is increasingly recognized as central to IBS pathophysiology, microbiota modulating strategies such as probiotics have emerged as rational therapeutic targets. This review aimed to examine the transition from dysbiosis to gut homeostasis and to compare the efficacy of mono-strain versus multi-strain probiotic formulations as adjunctive therapy in IBS. A PubMed search using the terms "probiotics" and "irritable bowel syndrome" was restricted to randomized controlled trials in human subjects published within the preceding five years; of thirty-six trials identified, thirty-four were retained, comprising fifteen mono-strain and nineteen multi-strain studies. Probiotics act through microbiota modulation, enhancement of epithelial barrier integrity, immune regulation, short-chain fatty acid production, and pathogen displacement. Both formulation types improved symptom severity, abdominal pain, stool parameters, and psychological measures, yet effects were inconsistent: several large, well-designed multi-strain trials were negative, and multi-strain products did not uniformly outperform single strains. Benefits were frequently strain-, dose-, and subtype-specific, with mechanistic gains sometimes preceding symptomatic

ISSN: 2584-2781

change. Across trials, probiotics were well tolerated with rare and mild adverse events. Thus, probiotics are a safe adjunctive treatment for IBS, with efficacy governed by strain, dosage, and patient subtype rather than strain multiplicity alone. Future progress requires subtype-stratified trials, multi-omics mechanistic characterization, and personalized probiotic selection.

Keywords: *Irritable bowel syndrome; Gut microbiota; Probiotics; Dysbiosis; Multi-strain probiotics; Gut-brain axis*

INADDP/PL/OF/16

POST-MARKETING SURVEILLANCE

Khushi Prajapati[1], Khushi Gupta[1*]
[1]*Department of Pharmacy, S.N. College of Pharmacy, Jaunpur, Uttar Pradesh, India-222132*
Email Id: *khushiabhi144@email.com, khushigp900@gmail.com*

Abstract:

After medications are approved and put on the market, post-marketing surveillance (PMS) is a crucial procedure used to monitor their efficacy, safety, and quality. A small number of patients participate in pre-approval clinical trials, which may not identify all uncommon or long-term side effects. Therefore, ongoing monitoring during actual use is required to find previously undiscovered safety issues. PMS involves gathering and analyzing data from various sources, including patient registries, electronic health records, prescription databases, spontaneous adverse drug reaction reports, observational studies, and published literature. The gathered data help identify new safety signals, variations in side effects, and potential drug-drug or drug-food interactions. After analyzing these results, pharmaceutical companies and regulatory bodies may take necessary steps, such as updating product information, issuing safety warnings, altering dosage recommendations, limiting use, or stopping a medication when needed. Assessing the efficacy and risk-benefit profile of medications in various patient populations under real-world circumstances is another benefit of post-marketing surveillance. It is crucial to maintaining public health and ensuring medications are used sensibly and safely. PMS is therefore an ongoing procedure that supports the safe use of medications throughout their life cycle and enhances pre-marketing clinical trials.

Keywords: *Risk management; Adverse drug reactions; Pharmacovigilance; Post-marketing surveillance; Safety signals*

INADDP/PL/OF/17

PCOS MANAGEMENT: FROM LIFESTYLE MODIFICATION AND EXERCISE TO NANOTECHNOLOGY-ENABLED DRUG DELIVERY

ISSN: 2584-2781

Khushi Prajapati[1], Dr Ramesh Kumar Gupta [1*]

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh, India-226028*

Email Id: *rkgupta@lko.amity.edu*

Abstract:

Hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology are the hallmarks of polycystic ovary syndrome (PCOS), a common and diverse endocrine metabolic illness affecting women of productive age. Insulin resistance and hypeusulinemia contribute to androgen excess and reproductive dysfunction in its complex etiology, which also include genetic hormonal metabolic, and environmental variables. The need for better therapeutic approaches is highlighted by the drawbacks of traditional treatment, such as low bioavailability and systemic side effects. The molecular pathophysiology, clinical symptoms, traditional treatment modalities, and the developing role of drug delivery system based on nanotechnology in the management of PCOS are all evaluated in this review. With an emphasis on nanoparticles Nano carriers, nan formulations, and Nano-enabled natural products, pertinent scientific literature was critically examined. Promising methods to improve drug solubility, stability, bioavailability, and targeted delivery while perhaps reducing systemic side effects are provided by nanotechnology. These approaches enable more accurate treatment of the metabolic and reproductive problems linked to PCOS and enhance therapeutic efficacy of pharmaceutical and natural therapies. All things considered, nano-based drug delivery is a potentially effective way to get around the drawbacks of traditional PCOS treatment; nevertheless, further preclinical and clinical research is needed to determine its safety, effectiveness, scale ability, and long-term therapeutic potential.

Keywords: *Polycystic Ovary Syndrome; Hyperandrogenism; Insulin Resistance; Nanotechnology; Nanocarriers; Bioavailability; Natural Products.*

INADDP/PL/ON/18

LACTOBACILLUS RHAMNOSUS AS A MICROBIOME-BASED ADJUNCT IN GRAVES' DISEASE: MECHANISTIC INSIGHTS, TRANSLATIONAL EVIDENCE, AND A FRAMEWORK FOR TARGETING THE GUT–THYROID AXIS

SudeshnaMohapatra[1,2] *Suneela Dhaneshwar**[1]

[1]*Amity Institute of Pharmacy, Amity University Maharashtra, Mumbai-Pune Expressway, Bhatan, PO – Somathane, Panvel, Mumbai – 410206, Maharashtra, India*

[2]*Department of Pharmacology, Parul*

ISSN: 2584-2781

Institute of Pharmacy and Research, Parul University, Vadodara, Gujrat, India
Email Id: *sudeshna0110@gmail.com*

Abstract:

Graves' disease is one of the most common causes of Hyperthyroidism, arising due to the TRAb and Treg imbalanced levels which results in reduced thyroid-specific immune tolerance, paving pathway towards gut-microbiome-targeted adjuncts such as *Lactobacillus rhamnosus* and *Lactobacillus rhamnosus GG* species. A study of 45-patient GD cohort versus 59 controls showed that GD was characterized by reduced alpha diversity and significantly altered bacterial composition with *Lactobacillus* abundance being higher in GD ($p<0.05$); a nine-genus diagnostic model achieved an area under the curve (AUC) of 0.8109 (95% CI: 0.7274–0.8945). GD leads to reduced gut microorganism diversity, depleted short-chain-fatty-acid producers, and increased intestinal permeability, sustaining LPS-driven TLR4/NF-κB signaling and a Th17-skewed, Treg-deficient immune state. A meta-analysis of eight autoimmune-thyroid-disease studies consisting of 196 participants have found reduced microbial richness in GD (Chao1 SMD −0.87, 95% CI −1.46 to −0.28) has reported altered *Lactobacillus* abundance. Furthermore, a 6-month clinical study of probiotic *Bifidobacterium longum* combination therapy along with methimazole in 9 GD patients reported recovery of TRAb to healthy levels. *L. rhamnosus GG* species have shown evidence in restoring the tight junction integrity and promoting tolerogenic dendritic cell and Treg responses under normal conditions suggesting its therapeutic effects in TRAb-producing B cells and maintaining the Treg imbalance in GD. This review summarizes the mechanistic plausibility and clinical evidence to evaluate the role of *L. rhamnosus* and *L. rhamnosus GG* as an adjunct therapy along with existing drug therapy for management of GD.

Keywords: *Graves' disease; Lactobacillus rhamnosus; gut-thyroid axis; TRAb; Treg/Th17.*

INADDP/PL/ON/19

ARTIFICIAL INTELLIGENCE AND NANOTECHNOLOGY USED FOR PREDICTION OF PHARMACOKINETICS AND PHARMACODYNAMICS OF THYROID DRUGS

Shekhar Pal[1], Anjali[1]*
[1]*Department of Pharmacology, Goel Institute of Pharmacy and Sciences, Lucknow, Uttar Pradesh, India*

Abstract:

Thyroid disorders are common health problems that often require long-term treatment with medicines such as levothyroxine. However, the effectiveness of these drugs can vary from one patient

ISSN: 2584-2781

to another because of differences in absorption, metabolism, food and drug interactions, and patient-related factors. Nanotechnology has emerged as a promising approach for improving drug delivery by enhancing drug stability, absorption, controlled release, and therapeutic effectiveness. At the same time, artificial intelligence (AI) is becoming useful in pharmaceutical research for understanding and predicting how drugs behave in the body. AI-based models can help predict important pharmacokinetic parameters such as absorption, distribution, metabolism, and clearance. The integration of AI and nanotechnology may provide a more effective strategy for the design and optimization of pharmaceutical delivery systems for thyroid. Artificial intelligence can be exploited to select suitable nanocarriers, forecast drug-release pattern and probable therapeutic responses prior to extensive laboratory studies. This approach can be extended further for a customization of a dosage for patient and Biochemical parameters like TSH, T3 and T4 levels. The field is promising, but challenges remain, such as limited data, model accuracy, validation, safety and regulatory requirements. To conclude, AI and nanotechnology can be helpful in providing more predictable, effective, and personalized care for thyroid disorders.

Keywords: *Artificial intelligence; Nanotechnology; Pharmacokinetics; Pharmacodynamics; Thyroid Drugs; Personalized Therapy*

INADDP/PL/OF/20

FROM FOOD WASTE TO THERAPEUTIC VALUE: A SUSTAINABLE PHARMACOGNOSTIC AND GREEN CHEMISTRY APPROACH FOR EXPLORING THE HEPATOPROTECTIVE POTENTIAL OF WATERMELON RIND AGAINST ETHANOL-INDUCED HEPATOTOXICITY

Deepak Yadav[1], Dr Prakash Chandra Gupta[*1], Dr Nisha Sharma[1], Dr Anju Singh[1]

[1]*The School of Pharmaceutical Sciences, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India*

Email Id: *dy3778161@gmail.com*

Abstract:

Alcohol consumption is an important public health concern in India and is associated with a range of adverse health consequences, particularly hepatic injury. Chronic or excessive ethanol consumption can induce oxidative stress, lipid peroxidation, inflammation, and hepatocellular damage, collectively contributing to ethanol-induced hepatotoxicity. This highlights the need for accessible, sustainable, and plant-based therapeutic approaches for hepatic protection. In this context, watermelon (*Citrullus lanatus*) rind, an abundantly discarded fruit-processing waste, represents a potentially valuable source of bioactive phytoconstituents. The present

ISSN: 2584-2781

study proposes a waste-to-value approach for transforming discarded watermelon rind into a potential pharmaceutical resource through sustainable pharmacognostic and green extraction strategies. Pharmacognostical evaluation of the watermelon rind will be undertaken to establish its identity, quality, and diagnostic characteristics, followed by preparation and evaluation of its hydroalcoholic extract. An ethanol–water solvent system will be explored as a comparatively safer extraction medium, consistent with the principles of green chemistry and resource-efficient processing. The resulting extract is hypothesized to possess hepatoprotective potential through attenuation of ethanol-induced oxidative hepatic injury. Scientific validation will be pursued through an appropriate experimental model of ethanol-induced hepatotoxicity, supported by biochemical, antioxidant, and histopathological parameters. Overall, this approach integrates pharmacognosy, waste valorization, green chemistry, sustainability, and therapeutic exploration, with the potential to reduce food waste, improve resource utilization, and generate value from an underutilized plant-derived material. The study may provide a foundation for developing watermelon rind as a sustainable source of bioactive compounds for hepatoprotective applications.

Keywords: *Citrullus lanatus; Ethanol; Hepatotoxicity; Green extraction; Waste valorization; Therapeutic validation*

INADDP/PL/OF/21

MODULATION OF THE GUT–BRAIN AXIS BY *BALANITES AEGYPTIACA* L. IN EXPERIMENTAL INFLAMMATORY BOWEL DISEASE-ASSOCIATED NEUROINFLAMMATION AND COGNITIVE DYSFUNCTION

Aniruddh Pratap Singh[1]*, Yati Sharma[1], Jeetendra Kumar Gupta[1]

[1]*Institute of Pharmaceutical Research, GLA University, Mathura, Uttar Pradesh, India*

Email Id: *singh.ani5050@gmail.com*

Abstract:

Inflammatory bowel disease (IBD) is a chronic inflammatory disorder of the gastrointestinal tract increasingly recognized to be associated with extraintestinal neurological manifestations, including cognitive dysfunction. Emerging evidence indicates that persistent intestinal inflammation and gut microbiota dysbiosis can influence central nervous system function through the gut–brain axis involving immune signalling, microbial metabolites, epithelial and blood–brain barrier dysfunction, and bidirectional communication between the enteric nervous system and central nervous system via the vagus nerve. In this context, identification of therapeutic agents capable of simultaneously attenuating intestinal inflammation and its neurological consequences represents an

ISSN: 2584-2781

emerging area of pharmacological research. *Balanites aegyptiaca* L., a traditionally used medicinal plant rich in bioactive phytoconstituents, has demonstrated promising anti-inflammatory and antioxidant properties, suggesting its potential role in regulating inflammation-associated neurological dysfunction. Therefore, the present study aims to investigate the neuroprotective potential of *B. aegyptiaca* against IBD-associated neuroinflammation and cognitive dysfunction in experimental animals, with particular emphasis on the gut–brain axis. Experimental IBD will be established using a validated chemical induction model, followed by treatment with a hydroethanolic extract of *B. aegyptiaca*. The therapeutic response will be evaluated through assessment of intestinal disease severity, behavioural and cognitive performance, inflammatory and oxidative stress biomarkers in intestinal and brain tissues, and selected parameters associated with gut microbial homeostasis and gut–brain communication. It is hypothesized that *B. aegyptiaca* treatment may attenuate intestinal inflammation and associated cognitive impairment by reducing systemic and neuroinflammatory responses, restoring redox balance, and favorably modulating intestinal microbial homeostasis. Collectively, the study is expected to provide mechanistic insights into the potential role of *B. aegyptiaca* in modulating the gut–brain axis and establish a pharmacological basis for its further investigation as a plant-derived therapeutic candidate for IBD-associated neuroinflammatory and cognitive complications.

Keywords: *Balanites aegyptiaca L; Inflammatory bowel disease; Gut–Brain-Axis; Neuroinflammation; Cognitive dysfunction.*

INADDP/PL/OF/22

DENDRIMERS IN NEUROLOGICAL DISEASE THERAPY: EMERGING NANOPLATFORM FOR TARGETED DRUG DELIVERY

Ankita Yadav[1] *, Dr Vivek Srivastava[1]
[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh, India-226028*
Email Id: ankita.yadav16@s.amity.edu

Abstract:

Neurological disorders such as Alzheimer's disease, Parkinson's disease, brain tumours, epilepsy, and ischemic stroke present considerable therapeutic difficulties because of their complicated pathophysiology and the limited ability of therapeutic agents to reach the brain. The blood–brain barrier, poor drug solubility, fast degradation, and systemic side effects generally reduce the effectiveness of standard treatments. Dendrimers are highly branched, nanoscale polymeric nanostructures having a well-defined structure, tunable surface chemistry, and a

ISSN: 2584-2781

number of functional groups, which makes them a promising option for the targeted delivery of therapeutic agents to the central nervous system. By modifying their surfaces with ligands, peptides, antibodies, or other targeting agents, it is possible to promote interaction with the blood–brain barrier and increase the accumulation of drugs at specific sites of neurological disease. Dendrimer-based systems have been studied for the delivery of small-molecule drugs, nucleic acids, proteins, and imaging agents, and potential benefits include better solubility, controlled release, improved cellular uptake, and less off-target toxicity. Recent preclinical studies show their potential in a variety of neurological disorders and point to their ability to combine therapeutic and diagnostic functions. However, important obstacles such as biocompatibility, toxicity, biodegradation, immune responses, formulation stability, scalability, and regulatory approval still act as barriers to clinical application. In summary, dendrimers are a versatile and adaptable nanoplatform that could lead to more accurate and effective treatment of neurological disorders by overcoming the main limitations of existing brain drug delivery systems.

Keywords: *Dendrimers; Nanomedicine; Parkinson's disease; Targeted drug delivery; Blood–brain barrier; Brain drug delivery*

INADDP/PL/OF/23

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN DRUG IMPURITY PROFILING: FROM PREDICTION AND IDENTIFICATION TO TOXICOLOGICAL RISK ASSESSMENT

Ashok Kumar Yadav[1], Shruti Srivastava[2*] Manish Kumar[3],

[1]*School of Pharmacy, Chandigarh University, Uttar Pradesh - 209859, India*

[2]*Directorate of Research, Innovation and Consultancy, Chandigarh University Uttar Pradesh 209859, India*

[3]*KIET School of Pharmacy, Krishna Institute of Engineering & Technology (KIET), Ghaziabad, Delhi-NCR, Uttar Pradesh, India*

Emal Id: *shruti.s29@gmail.com*

Abstract:

Drug impurities represent a serious issue in drug development processes as they affect both the safety and efficacy of medications. AI/ML technologies provide effective means for fast detection, prediction, and toxicity assessment of drug impurities. The present poster is devoted to the application of AI/ML for impurity profiling in drugs. The scope of discussion covers various approaches to predictive modelling, analysis of spectroscopic data, and deep learning architectures. Such issues as supervised and unsupervised learning in HPLC-MS analysis, impurity structure prediction and

ISSN: 2584-2781

substance identification, as well as AI-based toxicological risk stratification, impurity hazard classification, and genotoxic impurity prediction will be considered. Besides that, the presentation is focused on industrial uses, regulatory aspects, and examples of practical implementation, as well as the discussion of challenges including data quality, model interpretability, and validation. New trends in AI/ML, like federated learning, explainable AI, and high-throughput screening, will be analyzed as possible directions for the future.

Keywords: *Artificial intelligence; Deep learning; Drug impurity profiling; Machine learning; Toxicological risk assessment.*

INADDP/PL/OF/24

BRIDGING THE GAP BETWEEN PROPHYLACTIC EFFICACY AND PUBLIC HEALTH: A COMPREHENSIVE REVIEW OF HPV VACCINATION AND CERVICAL CANCER AWARENESS STRATEGIES

Abeera Imran[1], Archit Akhil[1], Dr. Mohini Chaurasia*[1], Dr. Raj Kumar Tiwari*[2], Dr. Alok Tripathi*[3]

[1] *Department of Pharmacy, Era College of Pharmacy, Era University, Lucknow, Uttar Pradesh, India*

[1] *Department of Pharmaceutics, Era College of Pharmacy, Era University, Lucknow, Uttar Pradesh, India*

[2]*Department of Pharmacognosy and Phytochemistry, Era College of Pharmacy, Era University, Lucknow, Uttar Pradesh, India*

[3]*Department of Pharmacology, Era College of Pharmacy, Era University, Lucknow, Uttar Pradesh, India*

Email Id: *abeeraimran600@gmail.com*

Abstract:

Cervical cancer continues to impose a severe global oncological burden, with the vast majority of cases directly linked to persistent human papillomavirus (HPV) infection. While prophylactic HPV vaccines offer a highly effective clinical intervention to halt cervical neoplasia, global coverage remains suboptimal and disproportionately skewed across geographic and socioeconomic boundaries. This review evaluates recent epidemiological trends alongside behavioral health data to identify the primary barriers to optimal vaccination uptake, focusing specifically on the critical deficit in public awareness. Current clinical data unequivocally support the efficacy of multivalent HPV vaccines in drastically reducing high-grade precancerous lesions when administered prior to viral exposure. However, translational success is frequently hindered by sociodemographic obstacles rather than clinical limitations. Widespread vaccine hesitancy is heavily driven by misinformation, cultural stigmas surrounding sexually transmitted infections, and a systemic lack of health literacy regarding HPV's oncogenic

ISSN: 2584-2781

potential. The literature consistently demonstrates that regions relying solely on vaccine procurement, without concurrent, targeted educational frameworks, struggle to achieve the coverage thresholds necessary for broad herd immunity. Conversely, intervention models that integrate routine clinical immunization with culturally tailored, community-led awareness campaigns yield significantly accelerated uptake metrics. Moving toward the World Health Organization's cervical cancer elimination targets requires a structural paradigm shift. Effective prevention strategies must treat public education and clinical distribution as codependent pillars, systematically dismantling behavioral barriers to ensure equitable prophylactic protection across vulnerable populations.

Keywords: *Human, Papillomavirus, World, Health, Organization, Cervical, Cancer*

INADDP/PL/OF/25

TARGETING CSF1R IN NEUROINFLAMMATION: FROM MICROGLIAL BIOLOGY TO SMALL-MOLECULE DRUG DISCOVERY

Shaqib Ali[1] Dr. Rahul Kumar Maurya*[1]
[1]*Department of Pharmacy, Amity Institute of Pharmacy, Amity University, Uttar Pradesh, Lucknow Campus, Lucknow-226028*
Email Id: *shaqibali786@gmail.com*

Abstract:

Activated microglia are essential for maintaining inflammatory signaling and neuronal damage in neuroinflammation, a complicated pathogenic process linked to the development of neurological and neurodegenerative diseases. The colony-stimulating factor 1 receptor (CSF1R), a tyrosine kinase receptor primarily expressed by macrophages and microglia, is a crucial regulator of microglial survival, proliferation, differentiation, and functional status. This receptor is a desirable therapeutic target because dysregulated CSF1R signalling can lead to chronic neuroinflammation and persistent microglial activation. The current study assesses CSF1R's potential as a target for small-molecule drug development in neuroinflammatory diseases and concentrates on its function in microglial biology. The study covers the structure and signalling pathways of CSF1R, the mechanisms controlling microglial activation and homeostasis, and the role of CSF1R-mediated signalling in neuroinflammatory disease processes. The identification and development of small-molecule CSF1R inhibitors, including their methods of action, target selectivity, pharmacological potential, and difficulties in clinical translation, are given special attention. New methods for enhancing safety, selectivity, and brain penetration are also taken into account. CSF1R-targeted drug discovery may offer potential for reducing disease-associated neuroinflammation while maintaining

ISSN: 2584-2781

vital microglial activities by fusing knowledge from microglial biology with developments in medicinal chemistry and pharmacology. This review identifies important factors for the development of next-generation small-molecule inhibitors for neurological diseases and emphasizes the therapeutic potential of CSF1R regulation.

Keywords: *CSF1R; Neuroinflammation; Microglia; Small-molecule inhibitors; Drug discovery; Neurodegenerative disorders*

INADDP/PL/OF/26

COUMARIN AMELIORATES LETROZOLE-INDUCED POLYCYSTIC OVARY DISORDER IN VIRGIN FEMALE WISTAR RATS BY TARGETING INFLAMMATORY PATHWAYS

Divyanshi Gupta [1,2], Lucy Mohapatra[1*], Ankita Wal[2]

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh, India-226028*

[2]*Department of Pharmacy, PSIT-Pranveer Singh Institute of Technology (Pharmacy), Bhauti Kanpur, Uttar Pradesh, India*

Email Id: *dr.lucymohapatra@gmail.com, lmohapatra@lko.amity.edu*

Abstract:

Polycystic ovary disorder (PCOD) is a multifactorial endocrine disorder marked by disrupted ovarian function, hormonal imbalance, insulin resistance and altered neuroendocrine control of the hypothalamic–pituitary–gonadal (HPG) axis. Emerging evidence suggests that phosphodiesterase-4 (PDE4) inhibition may reduce inflammatory signalling implicated in PCOS pathogenesis. In this study, we investigated the protective effect of coumarin against letrozole-induced PCOD in virgin female Wistar rats, with particular emphasis on its potential PDE4-inhibitory activity and modulation of inflammatory mediators, particularly interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α), and associated ovarian inflammatory responses, supported by molecular docking analysis. PCOD was experimentally induced by oral administration of letrozole (1 mg/kg) for 21 days.in this study we had taken 42 virgin female Wistar rats containing 6 animals and treated as follows-Healthy control: Vehicle, 0.5% carboxymethylcellulose (CMC); Diseased control: Letrozole 1 mg/kg orally in 0.5% CMC; Test group-1: Letrozole + COUMARIN (1 mg/kg orally); Test group-2: Letrozole + COUMARIN (2 mg/kg orally); letrozole + Magnesium glycinate (25 mg/kg orally); Letrozole + Exercise and Standard group: Letrozole + Metformin (100 mg/kg in D.W orally). Body weight, feed intake, water intake and vaginal smear was recorded on daily basis till the completion of the treatment tenure, whereas serum oestrogen, testosterone, progesterone and GABA; ovary and uterus histopathology; lipid profile; OGTT; GsH, MDA and TNF-

ISSN: 2584-2781

alpha in ovary tissue were estimated in the end of the treatment tenure. COUMARIN treated groups demonstrated an improvement in the irregularities of the oestrous cycle with respect to PCOS control group. Further, COUMARIN at both doses significantly ($p < 0.001$) reduced oxidative stress and inflammation in the ovary. It significantly ($p < 0.001$) reduced the serum testosterone and significantly ($p < 0.001$) elevated the serum oestrogen level. Histopathological reports depicted COUMARIN reduced follicular cysts and promoted ovulation. These results emphasize the possibility of COUMARIN as a treatment option for PCOS related reproductive and metabolic disorders, addressing the unmet need for effective PCOS management.

Keywords: *PCOS; Coumarin; Letrozole; Magnesium Glycinate; Exercise; TNF-α; Estrous cycle.*

INADDP/PL/OF/27

A STUDY ON EPIGENETIC ALTERATIONS CAUSED BY ENVIRONMENTAL THALLIUM EXPOSURE

Rishi Shukla[1], Swati Prakash*[1]
[1]*Department of Pharmacy, Amity Institute of pharmacy, Amity University Lucknow, Uttar Pradesh, India-226028*
Email Id: *rishi2005shukla@gmail.com*

Abstract:

Thallium (Tl) is a highly toxic, non-essential heavy metal of increasing environmental and public health concern due to its persistence, bioaccumulation, and potential to cause multisystem toxicity. It occurs naturally in minerals, rocks, coal, and sulfide ores and also source of contamination through anthropogenic activities. Industrial emissions through coal power plants, cement production, mining and smelting, non-ferrous metallurgy, and industrial wastewater are significant sources of release of thallium. The human exposure to thallium may occur by contaminated drinking water, food crops grown in polluted soils, aquatic organisms, cigarette smoke, and occupational contact. The high toxicity of Tl is primarily associated with its ability to mimic potassium, disrupt mitochondrial function and oxidative phosphorylation, bind sulfhydryl groups, and promote reactive oxygen species generation and cellular stress. These disturbances may interact with epigenetic regulatory processes that control gene expression without altering the underlying DNA sequence. Epigenetic mechanisms include DNA methylation, histone modifications, non-coding RNA-mediated regulation, chromatin remodeling, and RNA modifications. Current evidence suggests that Tl exposure may be associated with alterations in CpG-island methylation, histone methylation and related regulatory mechanisms, mitochondrial DNA copy number, and telomere length. Such epigenetic disturbances may contribute to

ISSN: 2584-2781

altered cellular responses. However, the thallium-specific epigenetic evidence remains limited, fragmented, and largely speculative. Further mechanistic studies are therefore required to establish causal relationships between Tl exposure, epigenetic alterations, and long-term health outcomes.

Keywords: *Thallium exposures; Epigenetic alterations; DNA methylation; Histone modification, Oxidative stress*

INADDP/PL/OF/28

PRECISION THERAPEUTICS IN THE MANAGEMENT OF NEUROLOGICAL DISORDERS

Satyam Tiwari[1], Supriya Roy[1*]

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Utter Pradesh, Lucknow Campus-226028, India*

Email Id: *sroy@lko.amity.edu*

Abstract:

Precision therapeutics is a modern patient-specific approach to the management of neurological disorders aimed at optimizing treatment by taking into account individual differences in genetic profile, molecular pathways, disease mechanisms, biomarkers, clinical characteristics, and therapeutic response. Neurological disorders including Alzheimer's disease, Parkinson's disease, epilepsy, multiple sclerosis, migraine and stroke are complex and heterogeneous, with significant variation in disease progression and response to conventional therapies. In this context, precision therapeutics is a paradigm shift from the classical "one-size-fits-all" treatment approach to a strategy that integrates pharmacogenomics, genomic, molecular biomarker, neuroimaging, and clinical data to identify appropriate therapeutic targets and tailor appropriate treatments. Pharmacogenomic approaches can predict drug efficacy, optimal dosing and the chance of adverse drug reactions, improving the safety and efficacy of therapy. Moreover, smart and advanced drug delivery mechanisms like nanoparticles, liposomes, polymeric nanoparticles, dendrimers and other nanocarriers are explored to improve drug stability, solubility, bioavailability and controlled release. These systems can enable targeted delivery of therapeutic agents to the brain and may help to overcome the blood-brain barrier, a major challenge in neurological drug delivery. The integration of precision medicine with novel drug delivery technologies may enable more efficacious targeting of disease-specific pathways with minimal systemic toxicity. Therefore, precision therapeutics has great potential for early diagnosis, personalized treatment, better therapeutic outcomes, less adverse effects and next generation therapies development of neurological disorders.

Keywords: *Precision therapeutics; Personalized medicine; Neurological disorders; Pharmacogenomics*

ISSN: 2584-2781

Biomarkers; Molecular targets; Targeted therapy; Drug delivery

INADDP/PL/OF/29

AI TOOLS FOR INTEGRATIVE DISEASE-TO-DRUG DISCOVERY

Shivani Singh, SupriyaRoy*

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, U.P., India-226028*
Email Id: sroy@lko.amity.edu

Abstract:

The development of new drugs is a complex and time-consuming process involving the identification of disease mechanisms, therapeutic targets, lead compounds, and their subsequent optimization. Artificial Intelligence (AI) has emerged as a powerful approach for integrating large and diverse biological and chemical datasets to accelerate the disease-to-drug discovery process. AI tools can analyze genomic, proteomic, transcriptomic, clinical, and chemical data to identify potential disease-associated targets and predict drug–target interactions. Machine learning, deep learning, natural language processing, and generative AI are increasingly being applied for target identification, drug repurposing, virtual screening, molecular docking, de novo drug design, ADMET prediction, and lead optimization**. Integrative approaches combine multiple sources of biological information to understand disease pathways and identify promising therapeutic interventions. AI-based platforms can also predict molecular properties, toxicity, pharmacokinetic behavior, and potential drug efficacy before experimental testing, thereby reducing the number of compounds requiring laboratory investigation. Furthermore, AI can support personalized drug discovery by integrating patient-specific molecular and clinical information. Despite these advantages, challenges such as data quality, model interpretability, algorithmic bias, validation, data privacy, and the need for experimental confirmation remain important. Overall, the integration of AI with multi-omics and chemical data provides a promising framework for transforming conventional disease-to-drug discovery into a faster, data-driven, and more efficient process.

Keywords: *Drug discovery; Disease to Drug Discovery; Target Identification; Molecular Docking; Generative AI; Drug Target Interaction.*

INADDP/PL/OF/30

EMERGING NON-OPIOID TARGETS FOR CHRONIC PAIN MANAGEMENT

Ragini Singh[1], Dr Swati Prakash[1*]

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Utter Pradesh, Lucknow Campus 226028, India*

ISSN: 2584-2781

Email Id: *sprakash@lko.amity.edu*

Abstract:

Chronic pain is a complex disorder involving multiple peripheral and central pain pathways, and long-term opioid therapy is associated with tolerance, dependence and other adverse effects. Therefore, the development of non-opioid analgesic targets has become a significant area of pharmaceutical research. Nav1.7, Nav1.8 and Nav1.9 voltage-gated sodium channels are novel targets that regulate neuronal excitability and pain signaling, and selective modulation of these channels could reduce pain without the typical opioid-related side effects. TRP channels, especially TRPV1, TRPA1, and TRPM8, are also being studied for their role in sensing and transmitting thermal and chemical pain stimuli. Other promising targets include P2X3 purinergic receptors, involved in nociceptor activation; CGRP signaling, particularly relevant to migraine and neurogenic pain; and nerve growth factor (NGF), which contributes to and nerve growth factor (NGF) involved in peripheral sensitization and chronic pain. Possible therapeutic targets, including ASICs (acid-sensing ion channels), cannabinoid receptors, K2P potassium channels, α2δ calcium-channel ligands and neuroimmune pathways are also being explored. Interfering with these pathways could provide more selective pain relief with fewer risks than opioid analgesics. To summarize, novel non-opioid targets present exciting opportunities for the development of safer, mechanism-based and potentially personalized approaches for the treatment of chronic pain.

Keywords: *Non-opioid analgesics; Chronic pain; Nav1.7; Nav1.8; Nav1.9.*

INADDP/PL/OF/31

NANOTECHNOLOGY IN SURGERY: THE FUTURE OF ULTRA – PRECISE AND MINIMALLY INVASIVE SURGERY

Kumari Jyoti, *Suraj Singh Yadav*
Kashi Institute of Pharmacy, Varanasi – 221307 (U.P.)

Abstract:

Nanotechnology is rapidly emerging as a transformative approach in modern surgical science, offering possibilities that extend beyond the limitations of conventional human -performed procedures. It involves the manipulation of materials at the nanoscale (1 –100 nm), where unique properties enable highly precise medical applications. In surgery, nanotechnology enhances accuracy and efficiency by enabling interventions at the cellular and molecular level, which are beyond the capability of the human hand. Nano-engineered tools and future nanorobots can potentially navigate through blood vessels, identify diseased cells, and perform targeted actions with extreme precision. This reduces damage to surrounding healthy tissues, minimizes surgical errors, and significantly improves

ISSN: 2584-2781

patient outcomes. Nanotechnology also improves implant technology and tissue regeneration. Nano-modified implant surfaces enhance biocompatibility, promote faster cell adhesion, and reduce the risk of rejection or failure. Additionally, nanoparticles are widely used for targeted drug delivery, ensuring that therapeutic agents act directly at the site of disease, thereby reducing systemic side effects. Another major advancement is the use of nano-sensors and smart monitoring systems, which allow real-time tracking of patient conditions after surgery. This enables early detection of complications and more personalized postoperative care. Although challenges such as safety, ethical concerns, and cost remain, nanotechnology has the potential to make surgeries more precise, less invasive, and more reliable than traditional human techniques. With continuous advancements, it may redefine the future of surgical practice.

Keywords: *Nanotechnology, minimally invasive surgery, Nanorobots, Target drug delivery*

INADDP/PL/ON/32

THERAPEUTIC INHIBITION OF FERROPTOSIS IN NEURODEGENERATIVE DISEASE: CURRENT ADVANCES AND FUTURE DIRECTIONS

Nitika Yadav[1*], Vivek Srivastava[2]
[1]Department of Pharmacology, *Amity Institute of Pharmacy, Amity University Uttar Pradesh Lucknow Campus, U.P., India-2028*
Email Id: *vsrivastava1@lko.amity.edu*

Abstract:

Iron build-up has been linked to the development and progression of several neurodegenerative disorders (NDDs). Ferroptosis is an iron-dependent form of programmed cell death linking metabolic failure to redox biology. Ferroptosis is characterized by a disruption of redox balance, iron homeostasis, and lipid metabolism. Microglia and oligodendrocytes are susceptible to ferroptosis under chronic inflammation and oxidative stress, exacerbating brain injury. Iron dysregulation is central to ferroptosis and therapies targeting iron homeostasis such as chelation have had mixed therapeutic success. Iron chelators like deferoxamine and deferiprone remove labile iron and decrease ROS, but they struggle to cross the BBB efficiently. Altered iron metabolism could be exploited as a biomarker and a therapeutic target as elevated levels of ferritin and transferrin receptor in brain fluid have been connected with shorter survival in amyotrophic lateral sclerosis (ALS). Individualized ferroptosis inhibition may require identifying genetic predispositions and polymorphisms in iron-regulating genes. Biomarkers such as serum ferritin, oxidative stress markers, and QSM-based iron mapping may be potentially beneficial in predicting responses to medication and monitoring disease

ISSN: 2584-2781

progression. Recent research has explored ferroptosis at molecular and signalling levels, including NUPR1 and TXNRD1-related mechanisms. Other therapeutic strategies targeting ferroptosis include modulation of the GPX4/GSH axis, SLC7A11-mediated cystine uptake, and Nrf2 signalling. These approaches may help limit lipid peroxidation and oxidative damage, providing potential opportunities for neuroprotection. Future studies should focus on improving BBB penetration, identifying reliable biomarkers, and translating ferroptosis-targeted strategies into clinical applications. Studies are needed to establish efficacy, safety, and disease-specific therapeutic strategies in neurodegenerative disorders.

Keywords: *Ferroptosis; Neurodegenerative diseases; Ferroptosis inhibition; Iron homeostasis; Therapeutic strategies*

INADDP/PL/OF/33

SGLT2 INHIBITION AS A NOVEL STRATEGY AGAINST ANTHRACYCLINE-INDUCED CARDIOTOXICITY

Devendra Pratap Singh[1], Dr Supriya Roy[1*]

[1]*Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, India.*

Email Id: *devendra.singh@s.amity.edu , sroy@lko.amity.edu*

Abstract:

Anthracyclines, especially doxorubicin, are crucial agents in cancer treatment; nonetheless, their clinical application is constrained by dose-dependent cardiotoxicity, which can lead to myocardial dysfunction and heart failure. Anthracycline-induced cardiotoxicity is mainly linked to the overproduction of reactive oxygen species, mitochondrial impairment, disrupted cellular energetics, calcium imbalance, apoptosis, and activation of inflammatory pathways. Sodium-glucose cotransporter-2 (SGLT2) inhibitors have emerged as potential cardioprotective agents, offering advantages that extend beyond merely lowering glucose levels. Experimental studies indicate that SGLT2 inhibition may mitigate cardiac damage caused by anthracyclines by decreasing oxidative stress, safeguarding mitochondrial function, enhancing myocardial energy metabolism, and inhibiting inflammatory signaling. Specifically, the modulation of antioxidant defenses, NF-κB activation, and NLRP3-related inflammation may play a role in maintaining cardiomyocyte integrity. Recent preclinical research also shows improvements in cardiac function, fibrosis, and biochemical indicators of myocardial injury following treatment with SGLT2 inhibitors. However, clinical data in populations treated with anthracyclines are still scarce, underscoring the necessity for well-structured prospective studies. Thus, SGLT2 inhibition represents a promising pharmacological approach to mitigate chemotherapy-related cardiac injury and

ISSN: 2584-2781

deserves further exploration in the field of cardio-oncology.

Keywords: *SGLT2 inhibitors; Anthracyclines; Doxorubicin; Cardiotoxicity; Oxidative stress; Mitochondrial dysfunction; Inflammation; Cardio-oncology.*

INADDP/PL/OF/34

IMMUNOMODULATORS AS A THERAPEUTIC FRONTIER

Kanav katoch[1], Lucy Mohapatra [1*]

[1] *Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh - 226028, India.*

Email Id: *lmohapatra@lko.amity.edu; dr.lucymohapatra@gmail.com*

Abstract:

Immunomodulators have moved from adjunctive tools to central pillars of modern therapeutics, reshaping treatment across oncology, autoimmune disease, and transplant medicine. Checkpoint inhibitors targeting the PD-1/PD-L1 axis remain the most represented category of approved cancer immunotherapies over the past decade and a half, with drugs blocking this pathway making up the bulk of new approvals. Yet this dependence on one mechanism comes with drawbacks: when a treatment landscape leans on a single target, tumors can more easily develop workarounds, not every patient benefits equally, and the case for exploring different mechanisms grows stronger. This has driven innovation into next-generation modalities, including checkpoint agonists, Toll-like receptor agonists, bispecific engagers, interleukin-based agents, and cell and gene therapies, alongside efforts to fuse nanotechnology and precision biomarker strategies with immunomodulation to improve specificity and reduce systemic toxicity. Radiation therapy, once viewed purely as a tumor-destroying tool, is now also understood to activate the immune system, helping expose tumor antigens and draw immune cells into tumors when paired with checkpoint-blocking drugs. Beyond oncology, immunosuppressive agents such as calcineurin and mTOR inhibitors remain foundational to transplant and autoimmune care, even as biosimilar competition reshapes their economics. Market and clinical trends point to a widening frontier: rising global cancer and autoimmune disease burden is expanding the eligible patient population, while immunostimulants grow faster than traditional immunosuppressants. Collectively, these developments signal a shift toward precision-guided, mechanistically diverse immunomodulation aimed at maximizing efficacy while minimizing collateral immune damage, positioning immunomodulatory therapeutics as one of medicine's most dynamic frontiers.

Keywords: *Autoimmune conditions; Immunomodulation; Nanomedicine;*

ISSN: 2584-2781

Immunosuppressants; Anti PD-1 anti CTLA-4

INADDP/PL/OF/35

EXOSOME-BASED NANOCARRIERS FOR INFLAMMATORY DISEASES: CURRENT ADVANCES AND FUTURE PERSPECTIVES

Sudhanshu Singh[1], Sakshi Srivastava[1*]
[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Uttar Pradesh Lucknow Campus, Lucknow, Uttar Pradesh, India-226028*
Email Id: *sudhanshu.singh6@s.amity.edu*

Abstract:

Exosomes (EXOs) development for numerous diseases are significantly influenced by inflammation. Inflammatory diseases include inflammatory bowel disease (IBD), rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), and others. All of these represent a major worldwide health burden. Conventional treatments can reduce symptoms, but traditional pharmaceutical therapies lack tissue selectivity, cause systemic toxicity, and have low absorption. All of these impede efficacy. Extracellular vehicles (EVs) have become the best bio-inspired nanocarriers. EXOs can pass through blood-brain and blood-urine barriers. Exosome-based treatments focus on a variety of sources. The sources include mesenchymal stem cells (MSCs). They range from the most extensively studied for their immunomodulatory qualities to affordable substitutes, such as plant- and milk-derived vesicles. They provide special stability for oral administration. Developments in EXOs engineering are featured. Surface functionalisation by targeting peptides to improve precision delivery. Genetic alteration of parent cells to overexpress anti-inflammatory cargo. Sonication, electroporation, and incubation are modern standards. Conjunction with the creation of mimetic nanovesicles (MNVs) intended to address the problem of poor natural yields. The lack of standardised isolation techniques generates difficulties in large-scale GMP-compliant manufacturing and complicated regulatory environments. It continues to impede the translation to clinical practice. Despite encouraging preclinical outcomes in reducing inflammation and fostering mucosal healing. Recent studies provide positive evidence. There is still a huge need for more large-scale, multi-sample, multi-genre, and long-term follow-up studies. Transformation to precision medicine is possible.

Keywords: *Exosomes; Inflammatory Diseases; Extracellular Vesicles; Mesenchymal Stem Cells; Mimetic Nanovesicles.*

INADDP/PL/ON/36

UNRAVELING THE GENETIC AND TRANSCRIPTOMIC LANDSCAPE OF CHRONIC RESPIRATORY DISEASES: A MULTI-OMICS

ISSN: 2584-2781

COMPARATIVE STUDY FOR TARGETED THERAPEUTICS

Abhishek Kumar[1], Ruchi Yadav[1]*
[1]*Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus, Lucknow, UP, India-226028*
Email Id: *abhishek.kumar165@s.amity.edu*

Abstract:

Chronic obstructive pulmonary disease (COPD), asthma and pulmonary fibrosis (PF)/interstitial lung disease (ILD) collectively account for a substantial share of the global respiratory-disease burden and are each understood to arise from the interaction of multiple genetic loci with environmental exposure rather than single-gene causation. This paper synthesises two RNA-sequencing (RNA-seq) variant-discovery studies conducted within the same research group to build a comparative, cross-disease view of the genetic architecture underlying these three conditions. Study *A* analysed eleven RNA-seq/single-cell RNA-seq (scRNA-seq) samples drawn from eight European Nucleotide Archive (ENA) BioProjects representing asthma and COPD, using a Galaxy-based workflow (FastQC, Bowtie2, SAMtools, FreeBayes/GATK HaplotypeCaller, SnpEff/SnpSift) together with a Python (Pandas, NumPy, Matplotlib) layer for downstream variant summarisation and visualisation. Study *B* analysed ten RNA-seq/scRNA-seq samples from five ENA BioProjects representing idiopathic pulmonary fibrosis (IPF) and systemic-sclerosis-associated ILD (SSc-ILD), processed through parallel Galaxy (FastQC, Bowtie2, SAMtools, FreeBayes, SnpEff) and Python-orchestrated (FastQC, Trimmomatic, HISAT2, GATK, VCFtools) pipelines, and additionally reports a Flask/MySQL multi-omics data portal spanning six respiratory diseases. Across all twenty-one samples, single-nucleotide polymorphisms were the dominant class of variation (43–74% of annotated variants), modifier (largely intronic/regulatory) variants dominated predicted functional effects (64.7–89.0%), and missense substitutions consistently outnumbered silent substitutions (missense/silent ratios of 1.20–2.58 for asthma/COPD samples and 1.38–2.42 for PF/ILD samples). Disease-specific candidate genes were confirmed in each condition — IL1RL1, IL13, IL4, TSLP and ORMDL3 for asthma; CHRNA3/CHRNA5, SERPINA1, MMP12 and HHIP for COPD; and MUC5B, TERT, SFTPC, DSP and VEGFA for PF/ILD — while FAM13A and TGFB1/SMAD3-pathway variants recurred across all three disease groups, and IL13/IL4/IL1RL1/TSLP variants recurred in both the asthma and COPD cohorts, consistent with the clinically recognised asthma–COPD overlap (ACO) phenomenon. These findings illustrate both the disease-specific and shared molecular signatures of chronic airway and interstitial lung disease and demonstrate the practical value of

ISSN: 2584-2781

reproducible Python-integrated RNA-seq variant-analysis pipelines for comparative respiratory-disease genomics.

Keywords: *Variant Calling; SnpEff; Galaxy platform; Python; GATK; FreeBayes; Multi-omics; Asthma–COPD overlap; Precision Medicine*

INADDP/PL/OF/37

FIBROMIRS AS A NEW FRONTIER IN ANTIFIBROTIC DRUG DISCOVERY

Stefna Varghese[1], Dr Vivek Srivastava*[1]
[1]*Departmet of Pharmacology, Amity Institute of Pharmacy, Amity University, Uttar Pradesh Lucknow Campus, Lucknow, India-226028*
Email Id: *stefna.varghese1@s.amity.edu*

Abstract:

Fibrosis is an irreversible pathological process characterized by the formation of fibrous connective tissue, leading to organ dysfunction and, in severe cases, organ failure. Currently, there are antifibrotic treatments; however, they are mostly ineffective. The reason for this is the lack of effective molecular targets. FibromiRs are a class of microRNAs that play an important role in regulating the pathological process of fibrosis. There are profibrotic microRNAs, for example, miR-21, which positively regulate such processes as activation of fibroblasts, differentiation of myofibroblasts, and production of extracellular matrix. On the other hand, there are antifibrotic microRNAs, such as the miR-29 family, which inhibit the formation of collagen and extracellular matrix. These two microRNAs, along with other regulators, participate in pathways of fibrosis, such as inflammatory response and transforming growth factor-β. The strategy used to treat fibrosis, based on the suppression of profibrotic microRNA activity or the introduction of exogenous antifibrotic microRNA molecules, would allow simultaneous regulation of several key points in the development of the disease. Nevertheless, the therapeutic application of microRNAs is complicated by their instability, a large number of interactions, specific tissue distribution, and the need for delivery molecules into cells. This indicates the need for promising approaches, such as nanostructures, liposomes, and exosomes, which can carry the desired microRNA directly to tumor cells, thereby achieving the desired effect.

Keywords: *FibromiRs; microRNA; fibrosis; Antifibrotic therapy; RNA therapeutics; Targeted delivery.*

INADDP/PL/OF/38

NETWORK PHARMACOLOGY-BASED IDENTIFICATION OF NATURAL PRODUCTS TARGETING LIVER DISEASES

Mahira Siddiqui[1], Purnendra Kumar Gupta*[1]

ISSN: 2584-2781

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Uttar Pradesh, Lucknow Campus Lucknow–226028*
Email Id: *pkgupta@lko.amity.edu*

Abstract:

Liver diseases are complex disorders, involving intertwined processes such as oxidative stress, inflammation, dysregulation of lipids, apoptosis and abnormal cellular signaling. The multi-target nature of these pathological mechanisms is a major challenge for conventional single-target drug discovery. Natural products are a rich source of structurally diverse bioactive compounds that can modulate several disease-associated targets at the same time. Network pharmacology provides a systems level framework to decode these intricate interactions through the integration of compound information, target prediction, disease-associated genes, protein-protein interactions and pathway enrichment. The present work focuses on the application of an integrated network pharmacology strategy to identify natural products with possible therapeutic relevance against liver diseases. The approach includes: bioactive compound screening, target prediction, disease-target identification, common-target analysis, construction of protein-protein interaction network, topological analysis, hub-target prioritization and Gene Ontology and KEGG pathway enrichment. Molecular docking is incorporated as a complementary approach to investigate potential binding interactions of prioritized natural-product compounds with key molecular targets. This integrated framework enables systematic mapping of compound-target-pathway-disease relationship and provides mechanistic insights into the potential hepatoprotective, antioxidant, anti-inflammatory and anti-fibrotic effects of natural products. This approach may allow rational prioritization of promising natural-product candidates and may contribute to the development of computationally guided, multi-target drug discovery for liver diseases.

Keywords: *Network pharmacology; Natural products; Liver diseases; Target identification; Molecular docking; Drug discovery.*

INADDP/PL/OF/39

CELL BASED ASSAYS: FROM CONVENTIONAL MODELS TO NEXT GENERATION PLATFORMS

Aryan Tiwari[1], Lucy Mohapatra [1*]
[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, Noida, Uttar Pradesh - 226028, India.*
Email Id: *lmohapatra@lko.amity.edu ; dr.lucymohapatra@gmail.com*

Abstract:

Cell-based assays provide a functional

ISSN: 2584-2781

approach for characterizing cellular products by assessing their biological responses within an appropriate in vitro cellular system. Beyond supporting preclinical safety assessment, these assays can offer valuable insights into the biological activity and functional potency of cell-based products. However, their application in routine lot-release testing remains limited because of relatively long assay durations, biological and experimental variability, and the resources and costs required for implementation. Although cell-based assays are highly informative for functional characterization, their broader adoption for standardized quality-control testing requires robust assay development, validation, and reproducibility. They provide physiologically relevant and multidimensional information, offering a more comprehensive assessment of compound responses than conventional biochemical methods. Cell-based assays have emerged as essential tools in biomedical research, drug discovery, and therapeutic development, enabling the evaluation of cellular responses, biological activity, toxicity, and mechanism of action. Conventional two-dimensional culture systems have provided valuable insights but often fail to reproduce the complexity of human physiology. Recent advances in three-dimensional cultures, organoids, microphysiological systems, and organ-on-chip technologies are transforming assay development by offering improved cellular interactions and tissue-like functionality. These next-generation platforms enhance predictive accuracy, reproducibility, and translational relevance while reducing dependence on conventional models. Their integration with advanced imaging and computational approaches represents a promising direction for future biomedical research and precision therapeutics.

Keywords: *Cell-based assays; Drug discovery; High-content screening; Cellular models;3D cell culture.*

INADDP/PL/OF/40

LIVER-ON-A-CHIP TECHNOLOGY FOR PREDICTING DRUG-INDUCED LIVER INJURY: AN EMERGING PLATFORM FOR SAFER DRUG DEVELOPMENT

Sara Ali[1], Purnendra Kumar Gupta[1]
1Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus Lucknow, India-226028 India
Email Id: *sara.ali@s.amity.edu, pkgupta@lko.amity.edu*

Abstract:

Drug withdrawal, regulatory limitations, and treatment failure are frequently caused by drug-induced liver damage (DILI), which is a significant safety concern throughout drug development. The capacity of traditional preclinical models, such as animal research and two-dimensional cell cultures, to replicate the

ISSN: 2584-2781

intricate human hepatic milieu and forecast clinically significant hepatotoxicity is frequently restricted. By combining human liver cells with microfluidic technologies, liver-on-a-chip (LoC) technology has become a cutting-edge microphysiological platform that replicates important facets of liver anatomy, function, and dynamic cellular interactions. The application of LoC technology for DILI prediction and its potential to enhance the evaluation of drug-induced hepatotoxic reactions are the main topics of this study. Microfluidic architecture, primary hepatocytes, induced pluripotent stem cell-derived hepatic cells, three-dimensional spheroids, organoids, and co-culture systems are among the key elements of hepatic chips that are highlighted in the review. It goes on to explain how LoC models can offer insights into drug metabolism, oxidative stress, cellular toxicity, inflammatory reactions, and functional alterations after drug exposure. The sensitivity and physiological relevance of these platforms may be improved by using cutting-edge bioengineering techniques and real-time monitoring. Automated data analysis, toxicity prediction, and the discovery of early DILI biomarkers may all be further supported by the possible integration of artificial intelligence with LoC systems. All things considered, LoC technology offers a potential link between traditional in vitro models and clinical results. It may help reduce reliance on animal models while promoting more dependable, human-relevant, and effective medication safety screening. These advancements can boost translational relevance across several drug development phases, enhance candidate selection, and enable early detection of hepatotoxic risks.

Keywords: *Artificial intelligence; Drug-induced liver injury; Drug safety; Hepatotoxicity; Liver-on-a-chip; Microfluidics*

INADDP/PL/OF/41

HIF-1α AS A MASTER REGULATOR OF NEUROVASCULAR AND NEURODEGENERATIVE PATHOLOGIES: MECHANISMS, DRUG DISCOVERY, AND THERAPEUTIC ADVANCES

Ojas Tripathi[1], Rahul Kumar Maurya[1]*
[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India*
Email Id: *rkmaurya@lko.amity.edu*

Abstract:

Hypoxia-inducible factor 1-alpha (HIF-1α) is the principal oxygen-sensing transcription factor in mammalian cells and has emerged as a decisive regulator of outcome across a wide range of neurovascular and neurodegenerative conditions. Its stability is governed by an oxygen-dependent hydroxylation system involving prolyl-hydroxylase (PHD) enzymes and the von Hippel-Lindau

ISSN: 2584-2781

(VHL) protein, while a second enzyme, factor-inhibiting HIF-1 (FIH-1), separately fine-tunes its transcriptional output; together these mechanisms allow HIF-1α to sit upstream of several hundred genes governing angiogenesis, glycolytic metabolism, inflammation, and cell survival. This duality extends to the major neurodegenerative disorders: HIF-1α contributes to tau hyperphosphorylation and amyloidogenic processing in Alzheimer's disease while also supporting neuroprotective responses; it is developmentally required for dopaminergic neuron survival in Parkinson's disease while accelerating alpha-synuclein pathology under sustained hypoxic stress; it drives a compensatory glycolytic response in Huntington's disease; and its nuclear transport is selectively impaired in amyotrophic lateral sclerosis. HIF-1α further intersects with oxidative and nitrosative stress, neuroinflammation (including microglial, astrocytic, oligodendroglial, and T-cell responses), and metabolic reprogramming, including mitophagy and the astrocyte-neuron lactate shuttle, positioning it as a genuinely unifying regulatory node across otherwise distinct disease mechanisms. The review evaluates current drug-discovery strategies targeting this pathway, including repurposed prolyl-hydroxylase inhibitors developed for renal anaemia and HIF-1α antagonists developed in oncology, and considers their translational potential for neurological indications. Overall, HIF-1α represents a promising but mechanistically complex therapeutic target, and systematic, disease-stage-specific pharmacological and clinical studies are required to translate its neuroprotective potential into safe and effective therapy.

Key Words- *HIF-1α; Neurovascular Pathologies; Neurodegeneration; Oxygen Sensing; Blood-Brain Barrier; Drug Discovery.*

INADDP/PL/OF/42

COPPER DYSREGULATION AND CUPROPTOSIS IN CARDIOVASCULAR DISORDERS: MECHANISTIC INSIGHTS & THERAPEUTIC PERSPECTIVES

Akshat Chauhan[1], Dr. Vivek Srivastava*[1]
1.Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh, India-226028
Email Id: akshat.chauhan11@s.amity.edu

Abstract:

Copper is an essential trace element involved in mitochondrial respiration, antioxidant defense, energy metabolism, and vascular function. However, disruption of copper homeostasis can lead to excessive copper accumulation or deficiency, resulting in oxidative stress, mitochondrial dysfunction, inflammation, and cellular injury. Recent studies have

ISSN: 2584-2781

identified cuproptosis as a novel form of regulated cell death that is closely associated with mitochondrial metabolism. Cuproptosis occurs when intracellular copper interacts with lipoylated proteins of the tricarboxylic acid cycle, particularly dihydrolipoamide S-acetyltransferase, leading to protein aggregation, loss of iron-sulfur cluster proteins, proteotoxic stress, and cell death. Emerging evidence suggests that copper dysregulation and cuproptosis may contribute to several cardiovascular disorders, including atherosclerosis, myocardial ischemia-reperfusion injury, cardiac remodeling, and heart failure. Copper transporters such as SLC31A1, ATP7A, and ATP7B may play important roles in regulating cellular copper levels and susceptibility to cuproptosis. This review discusses the molecular mechanisms of copper dysregulation and cuproptosis in cardiovascular diseases and evaluates their potential as therapeutic targets. Understanding these pathways may provide new opportunities for developing targeted strategies to protect cardiovascular function.

Keywords: *Copper homeostasis; Cuproptosis; Cardiovascular disorders; Mitochondrial dysfunction; Oxidative stress; Regulated cell death; Copper transporters; Cardiomyocytes.*

INADDP/PL/OF/43

RECENT ADVANCEMENT IN TUBERCULOSIS THERAPY

Himanshu Singh[1], Varsha Tiwari[1]*, Abhishek Tiwari[1]

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Uttar Pradesh, Lucknow Campus-226028, India*

Email Id: *vtiwari@lko.amity.edu*

Abstract:

Tuberculosis (TB) remains a major global infectious disease, with multidrug-resistant (MDR) and extensively drug-resistant (XDR) strains posing significant therapeutic challenges. Recent regimens such as BPaL/BPaLM can shorten drug-resistant TB treatment to 6 months. Host-directed therapies (HDTs), including metformin, statins, vitamin D, and NSAIDs, target pathways such as autophagy, inflammation, and metabolic regulation to enhance treatment efficacy. Advanced diagnostics, including CRISPR and whole-genome sequencing, enable rapid resistance detection, while artificial intelligence, machine learning, and robotics support TB diagnosis, resistance prediction, and personalized therapy. Thus, integrating novel drugs, HDTs, rapid diagnostics, and digital technologies offers a promising multidisciplinary strategy to shorten treatment and reduce the global TB burden. In 2024, the WHO endorsed 6 months of daily levofloxacin (Lfx) as tuberculosis preventive treatment (TPT) for individuals exposed to multidrug-resistant/rifampicin-resistant TB. The regimen offers favorable cost-effectiveness, safety, therapeutic efficacy,

ISSN: 2584-2781

and minimal interference with HIV treatment. Nevertheless, pre-extensively drug-resistant (pre-XDR) TB, particularly MDR-TB with quinolone resistance, remains a growing concern. Ongoing trials, including PHOENIx-MDR TB and BRANCH-TB, are investigating alternative preventive approaches involving delamanid and bedaquiline-based regimens. Despite this progress, prevention of MDR/rifampicin-resistant TB remains a major challenge for global TB control. Broader preventive options for pre-XDR TB, along with strategies to overcome drug intolerance, are urgently needed. Continued clinical trials and innovative therapeutic research will be pivotal in developing effective preventive regimens and advancing worldwide TB elimination efforts.

Keywords: *Tuberculosis; Global infectious disease; pre-XDR; Levofloxacin; Recent advances*

INADDP/PL/OF/44

FERMENTED FOOD AND THEIR BENEFICIAL EFFECTS ON BRAIN: A REVIEW

Purushottam Kumar[1], Dr. Lucy Mohapatra[1]*

[1] Department of Pharmacology, *Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India*

Email Id: lmohapatra@lko.amity.edu ; dr.lucymohapatra@gmail.com

Abstract:

Fermented foods are increasingly recognized as influencing brain health via their impact on the gut–brain axis. They include yogurt, kefir, kimchi, sauerkraut, fermented soy products, and other foods fermented using traditional techniques. The beneficial microorganisms and the products of fermentation such as bioactive peptides, vitamins, polyphenols, and other microbial metabolites influence brain functioning. During fermentation, microorganisms are known to produce and modify compounds such as short-chain fatty acids, GABA, B-vitamins, and various compounds with neuroactive and anti-inflammatory effect. The evidence suggests that consumption of fermented foods may improve the integrity of the intestinal barrier, influences the immune system, attenuates the inflammation all over the body, and regulates neurotransmitter metabolism. This is possible via the gut–brain link and involves microbial metabolites and their signalling to the brain, pathways of communication, and the hypothalamus–pituitary–adrenal axis. It is possible that fermented foods may improve the condition of the gut microbiota which is recognized to contribute to brain health. The degree to which these advantages manifest may be influenced by the kind of fermented food, along with other factors such as microorganisms present, the fermentation process, dietary habits and personal differences. In this study, we provide a summary of the knowledge

ISSN: 2584-2781

currently available relating to the nutritional value of fermented food and the properties of its microflora, as well as discuss the potential effect of fermented food on brain health via the gut-brain axis. Moreover, we identify the gaps in knowledge on this subject as well as present opportunities to utilize fermented food for maintaining good health of the brain and mind.

Keywords: *Fermented foods; Brain health; Probiotics; Microbial metabolites; Mental health.*

INADDP/PL/OF/45

NANOTECHNOLOGY IN ALZHEIMER'S DISEASE: PHARMACOLOGICAL APPLICATIONS AND THERAPEUTIC PERSPECTIVES

Shakshi Rai[1], Dr Alok Mukerjee[1]
[1]*United Institute of Pharmacy, UPSIDC Industrial Area, Naini, Prayagraj 211010*
Email Id: *shakshirai2203@gmail.com*

Abstract:

Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by cognitive decline and complex pathological changes, including amyloid-β accumulation, tau pathology, cholinergic dysfunction, oxidative stress, neuroinflammation, and synaptic impairment. Despite advances in pharmacotherapy, effective management remains challenging due to the multifactorial nature of the disease and the restrictive nature of the blood–brain barrier (BBB), which limits the delivery of therapeutic agents to the brain. Nanotechnology has emerged as a promising approach in pharmaceutical research with potential to overcome BBB-related challenges and enhance therapeutic effects. Nano-enabled strategies may influence multiple pharmacological pathways involved in AD, including amyloid-β pathology, tau-associated changes, cholinergic dysfunction, oxidative stress, neuroinflammation, and neuronal damage. Preclinical studies have demonstrated promising effects on biochemical, molecular, behavioural, and cognitive outcomes. This presentation highlights the pharmacological potential of nanotechnology in targeting interconnected pathological mechanisms of AD, while discussing challenges related to safety, nanotoxicity, dose optimization, and translation from preclinical research to clinical applications. Nanotechnology may therefore provide a promising platform for developing multi-target therapeutic strategies for Alzheimer's disease.

Keywords: *Alzheimer's disease; Nanotechnology; Blood–brain barrier; Neuroprotection; Neuroinflammation.*

ISSN: 2584-2781

INADDP/PL/OF/46

EMERGING THERAPEUTIC STRATEGIES FOR POLYCYSTIC OVARY SYNDROME: CURRENT ADVANCES, CHALLENGES, AND FUTURE PROSPECTS

Sumit Kumar Singh[1], Chandani Nigam1*
[1]*Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India*
Email Id: *cnigam@lko.amity.edu*

Abstract:

Polycystic Ovary Syndrome (PCOS) is one of the most prevalent endocrine and metabolic disorders affecting women of reproductive age, characterized by hyperandrogenism, chronic anovulation, and polycystic ovarian morphology, frequently accompanied by insulin resistance, obesity, and dyslipidaemia. Conventional management, comprising lifestyle modification, combined oral contraceptives, insulin sensitizers such as metformin, and anti-androgens, offers symptomatic relief but does not adequately address the multifactorial pathophysiology underlying the syndrome. Growing insight into the genetic predisposition, chronic low-grade inflammation, gut microbiota dysbiosis, hyperinsulinemia, and neuroendocrine dysregulation associated with PCOS has directed research toward newer and more targeted therapeutic strategies. Emerging approaches include GLP-1 receptor agonists and novel insulin-sensitizing agents for metabolic correction, inositol isomers for improving ovulatory and metabolic function, probiotics and gut-microbiome-modulating interventions, anti-inflammatory and antioxidant agents, and nutraceutical or herbal formulations with fewer adverse effects. Advances in ovulation induction, including letrozole-based protocols, and the exploration of precision-medicine approaches based on distinct PCOS phenotypes and biomarkers, are further reshaping individualized patient care. Despite these advances, significant challenges persist, including phenotypic heterogeneity, absence of universally standardized diagnostic criteria, limited long-term safety and efficacy data for newer agents, and a scarcity of large-scale randomized controlled trials. This review summarizes the current understanding of PCOS pathophysiology, critically evaluates existing and emerging therapeutic strategies, and highlights the challenges that limit their clinical translation. It further explores future prospects such as biomarker-guided and artificial-intelligence-assisted diagnosis, personalized treatment algorithms, and integrative therapeutic models, with the aim of identifying knowledge gaps and opportunities for developing safer, more effective, and individualized management strategies for women living with PCOS.

Keywords: *Polycystic Ovary Syndrome; Hyperandrogenism; Insulin resistance; Emerging therapies; Precision medic*

ISSN: 2584-2781

INADDP/PL/OF/47

APOPTOSIS IN PARKINSON'S DISEASE: A NEW THERAPEUTIC TARGET

Shashank Bajpai[1], Dr Lucy Mohapatra[1]*
[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Uttar Pradesh, Lucknow Campus, U.P., India-226028*
Email Id: *lmohapatra@lko.amity.edu; dr.lucymohapatra@gmail.com*

Abstract:

Parkinson's disease (PD) is the second most common neurodegenerative disorder and is characterized by the progressive degeneration of dopaminergic neurons in the substantia nigra. It produces both motor symptoms, such as bradykinesia and resting tremor, and non-motor symptoms, including psychiatric and respiratory disturbances. Apoptosis plays an important role in PD progression through neuronal death triggered by mitochondrial dysfunction, oxidative stress, and inflammatory signaling. Although the substantia nigra is the major region affected, other brain nuclei may also undergo neuronal damage, contributing to diverse clinical manifestations. Intrinsic mitochondrial and extrinsic inflammatory pathways are considered important mechanisms of apoptosis in PD. Understanding these cell-death pathways may help clarify disease progression and identify potential therapeutic targets. Therefore, investigating apoptosis and its relationship with oxidative stress, inflammation, and mitochondrial dysfunction may contribute to the development of improved strategies for PD prevention and treatment.

Keywords: *Parkinson's disease; Cell death mechanisms; Apoptosis; Neural control; Autophagy; PD animal models*

INADDP/PL/OF/48

NANOTECHNOLOGY- BASED THERAPEUTIC STRATEGIES FOR HEPATOTOXICITY

Vaibhav Singh[1], Supriya Roy[1]*
[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh, India-226028*
Email Id: *sroy@lko.amity.edu*

Abstract:

Hepatotoxicity is one of the significant clinical problems characterized by overproduction of reactive oxygen/nitrogen species (RONS), oxidative stress, inflammation, and hepatocyte injury. Dysfunction of mitochondria and activation of inflammatory cells result in an increase in RONS production, whereas ongoing inflammatory signaling causes additional liver damage. The use of traditional antioxidants and anti-inflammatories may be inefficient due to poor targeting and adverse effects. Nanotechnology provides

ISSN: 2584-2781

promising methods due to its features such as targeted drug delivery, increased bioavailability, controlled release, and specific accumulation in the liver. RONS scavenging nanoparticles, nano enzymes, and antioxidant containing nanocarriers decrease oxidative stress and recover the activity of antioxidants, while anti-inflammatory nanodrugs affect inflammatory pathways and decrease inflammatory mediators such as TNF-α and IL-6. In summary, multifunctional nanotechnology-based therapy for oxidative stress, inflammation, and mast cell activation may represent a promising way for hepatoprotection.

Keywords: *Hepatotoxicity; Nanotechnology Nanoparticles, Oxidative stress, Inflammation, Mast cell activation.*

INADDP/PL/OF/49

TAU-TARGETED ANTISENSE OLIGONUCLEOTIDE THERAPY IN ALZHEIMER'S DISEASE: A NEXT-GENERATION DISEASE-MODIFYING APPROACH

Anmol Yadav[1], Swati Prakash*[1]
[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India.*
Email Id: *sprakash@lko.amity.edu*

Abstract:

Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by cognitive decline, neuronal dysfunction, and the accumulation of amyloid-β plaques and pathological tau. Although amyloid-β remains a major therapeutic target, tau pathology is closely associated with neuronal loss and clinical progression, making tau reduction an important disease-modifying strategy. Antisense oligonucleotides (ASOs) are synthetic nucleic acid sequences designed to bind specific RNA molecules and regulate gene expression. Tau-targeted ASOs directed against microtubule-associated protein tau (MAPT) mRNA offer a promising approach to reduce tau synthesis at the transcript level. Diranersen (BIIB080) is an investigational intrathecally administered ASO designed to decrease MAPT expression and subsequently reduce tau production. Early clinical studies demonstrated reductions in cerebrospinal fluid total tau and phosphorylated tau, together with decreases in tau pathology assessed by positron emission tomography. Recent Phase 2 findings have further supported its biological activity, showing reductions in tau-related biomarkers and exploratory signals of potential cognitive benefit, although the primary dose-response endpoint was not achieved. These findings indicate that tau lowering may be a viable therapeutic strategy while highlighting the need for further investigation of optimal dosing, long-term safety, clinical efficacy, and appropriate patient selection. Tau-targeted

ISSN: 2584-2781

ASO therapy may therefore represent a next-generation disease-modifying approach that could complement amyloid-directed treatments and provide a broader therapeutic strategy for AD. By directly targeting tau production, this approach may address a downstream driver of neurodegeneration and potentially improve disease control across stages of AD while supporting precision therapeutic development.

Keywords: *Alzheimer's disease; tau; antisense oligonucleotide; MAPT; Diranersen.*

INADDP/PL/OF/50

EVALUATING THE CARDIOPROTECTIVE EFFECTS OF SILYMARIN AGAINST CARDIAC HYPERTROPHY IN RATS BY TARGETING THE GUT-CARDIAC-AXIS

Jaya Singh[1], Lucy Mohapatra[1], Himani Awasthi[2]*

[1]Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India.

[2]Hygia Institute of Pharmaceutical Education and Research Lucknow

Email Id: *jayasingh5124@gmail.com; lmohapatra@lko.amity.edu*

Abstract:

Several studies prove that alterations in microbial composition of intestinal barrier function result in circulating metabolites and inflammatory signals which stimulate heart remodeling; this connection is known as the gut-cardiac axis. A plant based bioactive silymarin from *Silybum marianum* plant, have long been used in liver illnesses but its effects on cardiac outcomes through the gut-mediated route have not been studied. This investigation sought to ascertain whether alterations in gut microbial health and barrier integrity influence the effects of silymarin therapy against cardiac hypertrophy. Male Sprague Dawley rats were administered isoproterenol (ISO, 5 mg/kg, sc, once daily) for 21 days to induce cardiac hypertrophy. Echocardiograms, histological measurements of myocyte hypertrophy and fibrosis, markers of oxidative stress and inflammation in the gut, diversity profiles of the gut microbiome linked short chain fatty acids were all used to measure the various cardiac structure and function markers. There was a significant ($p<0.01$) improvement in the heart weight ratio of Silymarin treated diseased rats after 21 days of treatment. It was also evidenced by significant decrease of ANP and BNP level, two indicative markers of cardiac hypertrophy in the treatment group. Silymarin significantly decreased cardiac oxidative stress via decreasing (MDA) and increasing (GSH, catalase and SOD) ($p<0.001$) and inflammatory markers such

ISSN: 2584-2781

as NF-KB, TNF-α and IL-6 were significantly declined ($p<0.01$). Importantly, silymarin improved intestinal barrier integrity by increasing occludin, and claudin-1 ($p<0.05$), restored gut microbial diversity. Echocardiographs and histography outcomes revealed noticeable improvement among Silymarin treatment groups. These findings suggest that the cardioprotective effect of silymarin may involve modulation of the gut–cardiac axis in addition to its direct antioxidant and anti-inflammatory actions.

Keywords: *Silymarin; Cardiac hypertrophy; Gut-cardiac axis; Cardio protection; Intestinal barrier integrity; Oxidative stress*

INADDP/PL/OF/51

INVESTIGATION OF THE NEUROPROTECTIVE EFFECT OF SOYBEAN EXTRACT AND PIPER NIGRUM EXTRACT IN CADMIUM-INDUCED NEURODEGENERATION.

Harshit Pal[1], Dr Ramesh Kr. Gupta*[1], Dr Himani Awasthi[2]

[1] *Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, U.P., India-226028*

[2]*Department of Pharmacology, Hygia Institute of Pharmaceutical Education and Research-Lucknow*

Email Id: *hpal@lko.amity.edu*

Abstract:

Cadmium (Cd) exposure is associated with neurodegeneration, largely through oxidative stress, neuroinflammation, and cholinergic dysfunction. The present study evaluated the neuroprotective potential of soybean (*Glycine max*) and *Piper nigrum* extracts, administered individually and in combination, against Cd-induced neurodegeneration in rats. Cadmium chloride ($CdCl_2$; 3 mg/kg, p.o.) was administered for 4 weeks to induce neurotoxic alterations. Cognitive and behavioural performance was assessed using the Morris Water Maze (MWM) and Novel Object Recognition (NOR) tests. Biochemical parameters associated with oxidative stress, antioxidant defence, neuroinflammation, and cholinergic function were evaluated, including malondialdehyde (MDA), reduced glutathione (GSH), catalase (CAT), nitric oxide (NO), interleukin-6 (IL-6), and acetylcholinesterase (AChE). Hippocampal histopathological changes were also examined to assess neuronal integrity. Cadmium exposure produced marked alterations in behavioural performance, biochemical parameters, and hippocampal morphology, consistent with neurodegenerative changes. Treatment with soybean and *Piper nigrum* extracts significantly attenuated these Cd-induced alterations. The extracts improved cognitive function and antioxidant defence while reducing oxidative stress, neuroinflammation, and cholinergic dysfunction. Notably, the

ISSN: 2584-2781

combined treatment produced a more pronounced neuroprotective effect compared with the individual extracts, indicating the potential benefit of their complementary actions. Overall, the findings demonstrate that soybean and *Piper nigrum* extracts, particularly when used in combination, possess promising neuroprotective potential against Cd-induced neurodegeneration. This study supports further investigation of their molecular mechanisms, active phytoconstituents, long-term efficacy, safety, and therapeutic potential in neurodegenerative conditions. It may provide a basis for future preclinical studies aimed at developing natural strategies for managing neurodegenerative changes associated with cadmium exposure.

Keywords: *Cadmium; Piper nigrum; Glycine max; Neuroprotection; Oxidative stress; Neuroinflammation; Cholinergic dysfunction; Cognitive impairment.*

INADDP/PL/OF/52

NETWORK PHARMACOLOGY-BASED ELUCIDATION OF *NEOLAMARCKIA CADAMBA* BARK UNDERLYING THE NOOTROPIC ACTIVITY AGAINST SCOPOLAMINE-INDUCED AMNESIA IN SWISS MICE

Hansraj Kumar[1], Dr. Ramesh Kr. Gupta*[1]
[1]*Department of Pharmacology, Amity Institute of Pharmacology, Amity University, Lucknow Campus, U.P., India-226028*

Email Id: *hkumar@lko.amity.edu; rkgupta@lko.amity.edu*

Abstract:

Background: This study investigated the nootropic and neuroprotective potential of *Neolamarckia cadamba* bark extract (NLCBE) against scopolamine-induced amnesia, integrated network pharmacology and molecular modeling to delineate the molecular mechanisms that may underlie the observed in vivo effects. **Methods:** Bark-derived phytoconstituents were screened for drug-likeness and blood-brain barrier permeability, followed by compound-target prediction and intersection with curated nootropic-associated genes. Common targets were subjected to STRING protein-protein interaction analysis, Cytoscape-MCODE clustering, cytoHubba consensus ranking, and GO/KEGG enrichment. Network-prioritized ligand-target pairs were evaluated by Glide docking and Prime MM-GBSA. In parallel, the effects of NLCBE (250 and 500 mg/kg, p.o.) were assessed in scopolamine-treated mice using the elevated plus maze and Morris water maze, together with brain acetylcholinesterase (AChE), oxidative-stress, and inflammatory markers. **Results:** Five bark constituents satisfied the initial in silico screening criteria, while Betulinic acid, Harmane, and Neolamarckine A yielded high-probability predicted targets. Twenty-six genes were common to the compound-target and nootropic datasets. The PPI network

ISSN: 2584-2781

contained 26 nodes and 29 interactions, and MCODE/cytoHubba analysis identified MAOA, MAOB, BCHE, SLC6A2, HTR1A, HTR1B, HTR1D, HTR2B, and HTR2C as consensus hub proteins. Enrichment analysis highlighted neuroactive ligand-receptor signaling, serotonergic synapse, GPCR signaling, calcium signaling, and cyclic-nucleotide pathways. Docking and post-docking free-energy analysis supported HTR1B as a plausible network-consistent target for Neolamarckine A and suggested multi-target interactions of Harmane with MAOA/MAOB and HTR2C. In vivo, NLCBE improved behavioral indices of learning and memory, reduced brain AChE activity and TNF-alpha, supported IL-10 restoration, decreased oxidative damage, and increased endogenous antioxidant defenses. **Conclusion:** The combined computational and experimental findings indicate that NLCBE may ameliorate scopolamine-induced cognitive dysfunction through coordinated modulation of cholinergic, monoaminergic/serotonergic, oxidative-stress, and inflammatory processes. This will provide mechanistic hypotheses for future translational research.

Keywords: *N. cadamba; Scopolamine; Nootropic activity; Network pharmacology; Molecular docking; Cognitive impairment*

INADDP/PL/OF/53

EPIGALLOCATECHIN-3-GALLATE (EGCG) AS AN EMERGING THERAPEUTIC CANDIDATE FOR UTERINE FIBROIDS: MECHANISMS AND CLINICAL PERSPECTIVES

Riddhi Mishra[1], Neha Mathur[1]*
[1]*Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, India 226028*
Email Id: *riddhi.mishra3@s.amity.edu*

Abstract:

Uterine fibroids are non-cancerous tumors in the uterus that can lead to heavy periods, as well as abdominal discomfort, lack of blood (anemia), and problems in terms of reproduction. Current methods of treating uterine fibroids involve the use of hormones, minimally invasive procedures, and surgical methods, but these have their own shortcomings such as side effects, persistence, and issues of fertility. EGCG, which is one of the main catechins found in green tea, has been gaining attention regarding the treatment of uterine fibroids. This work highlights the possibilities of this approach as well as the ways through which EGCG works in case of this condition. The data reviewed in this paper reveal that EGCG can be effective in terms of curbing the growth of uterine fibroids because of its effects on cell starvation (apoptosis) and extracellular matrix. EGCG possesses antioxidant and anti-inflammatory

ISSN: 2584-2781

properties which can also play a role in inhibiting fibroid growth. However, there are still some limitations associated with the use of EGCG including a question of its bioavailability and safety. Moreover, more studies should be conducted to conclude and affirm the effectiveness of EGCG in situation with uterine fibroids.

Keywords: *Epigallocatechin-3-gallate (EGCG); Uterine fibroids; Leiomyoma; Green tea; Apoptosis; Extracellular matrix; Antioxidant; Phytotherapy; Natural therapeutic agents.*

INADDP/PL/OF/54

STIMULI-RESPONSIVE NANOGELS FOR PRECISION TOPICAL THERAPIES OF PSORIASIS: EXPLOITING THE INFLAMMATORY MICROENVIRONMENT FOR CONTROLLED DRUG RELEASE

Gargi Medhi[1], Dr. Ramesh Kr. Gupta*[1]

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow-226028, U.P, India*

Email Id: *gargi.medhi@s.amity.edu; rkgupta@lko.amity.edu*

Abstract:

Psoriasis is a chronic, immune-mediated inflammatory skin disorder characterized by keratinocyte hyperproliferation, abnormal differentiation, and persistent cutaneous inflammation. Conventional topical therapies often show limited skin penetration, rapid drug loss and systemic adverse effects, highlighting the need for targeted and controlled drug delivery approaches. Stimuli-responsive nanogels offer a promising strategy for precision topical therapy by responding to specific pathological changes within the psoriatic microenvironment. These nanosized, cross-linked polymeric systems can be engineered to respond to stimuli such as altered pH, reactive oxygen species (ROS), inflammatory enzymes, and temperature, enabling site-specific and controlled drug release. In psoriatic lesions, elevated ROS levels, inflammatory mediators and enzymatic activity can act as endogenous triggers for nanogel activation. This approach may enhance drug accumulation at the inflamed skin site, improve therapeutic efficacy, reduce dosing frequency and minimize exposure to healthy tissues. Incorporation of anti-inflammatory, immunomodulatory or corticosteroid drugs into stimuli-responsive nanogels may provide sustained drug release and improved pharmacological outcomes. Thus, exploiting the inflammatory microenvironment represents a promising approach for developing safer, more effective and patient-oriented topical therapies for psoriasis.

Keywords: *Psoriasis, nanogel; Stimuli-responsive drug delivery, Inflammatory microenvironment, Controlled release, Topical therapy, Reactive oxygen species.*

ISSN: 2584-2781

INADDP/PL/OF/55

CURRENT PHARMACOLOGICAL MANAGEMENT OF RHEUMATOID ARTHRITIS: FROM DMARDS TO BIOLOGICS

Aman Kumar Soni[1], Dr. Ramesh K Gupta[1*]

[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh, India-226028*

Email: *aman.soni8@s.amity.edu*

Abstract:

Rheumatoid arthritis (RA) is a chronic systemic autoimmune disease that causes continuous inflammation of the synovium, progressive joint destruction, discomfort and functional impairment. The current pharmacological management is aimed at remission or low disease activity with early diagnosis, early treatment and treat to target. Conventional synthetic disease-modifying antirheumatic medications (csDMARDs), especially methotrexate, remain the foundation of first therapy owing to their proven efficacy, safety and cost-effectiveness. Alternatives or combination therapy with leflunomide, sulfasalazine and hydroxychloroquine are employed depending on the severity of disease and features of the patient. For individuals with insufficient response to csDMARDs, biologic DMARDs (bDMARDs) and targeted synthetic DMARDs (tsDMARDs) are available as further therapy alternatives. Biologic therapy includes tumor necrosis factor (TNF) inhibitors, interleukin-6 (IL-6) receptor inhibitors, T-cell co-stimulation modulators, and B-cell–depleting drugs. Inhibitors of Janus kinase (JAK) are an important family of tsDMARDs that alter intracellular cytokine signalling and provide an oral treatment option. When choosing treatment, disease activity, comorbidities, prior treatment response, safety hazards, and patient preferences should be taken into account. Short term symptomatic relief can be obtained with glucocorticoids and non-steroidal anti-inflammatory medicines but they should not substitute disease-modifying therapy. Regular assessment of therapy efficacy, adverse effects, risk of infection and other consequences is required. The availability of biologic and targeted synthetic treatments has made more personalized approaches to treatment and better control of disease easier than ever from traditional DMARDs. Optimal management consists on timely escalation/adjustment of therapy to minimize joint injury and preserve long-term function and quality of life. Appropriate screening for infections, immunizations, and laboratory abnormalities, and shared decision-making before and during advanced immunomodulatory treatment are a must to optimize safety and effectiveness.

Keywords: *Rheumatoid arthritis; Disease-modifying anti-rheumatic drugs; Methotrexate; Biologics; JAK inhibitors; TNF inhibitors*

ISSN: 2584-2781

INADDP/PL/OF/56

ATRIAL SEPTAL DEFECT (ASD): A COMPREHENSIVE OVERVIEW OF DIAGNOSIS AND MANAGEMENT

Abhishek Yadav[1], Poonam Parashar*[1]
[1]*Department of Pharmaceutics, Amity Institute of Pharmacy, Amity University Uttar Pradesh Lucknow Campus, Lucknow-226028, India*
Email Id: *abhishek.yadav55@s.amity.edu*

Abstract:

An atrial septal defect (ASD) is a common congenital heart abnormality characterized by an abnormal opening between the right and left atria. This anomaly produces a left-to-right shunt by allowing oxygenated blood to pass from the left atrium to the right atrium. This results in an increase in pulmonary blood flow and, with large defects, a slow hypertrophy of the right atrium and right ventricle may occur. Minor atrial septal defects (ASDs) may be asymptomatic and sometimes resolve spontaneously, whereas more significant defects may present with clinical manifestations and problems. Dyspnea, fatigue, reduced exercise tolerance, palpitations, recurrent respiratory infections and growth retardation in children are common symptoms. Untreated chronic ASD can lead to pulmonary hypertension, atrial arrhythmias, right-sided heart failure, and perhaps paradoxical embolism and stroke. Timely diagnosis and proper treatment are essential to prevent lasting heart and blood vessel problems. Doppler echocardiography is the diagnostic test of choice for detection of the defect, determination of its size and anatomic location, analysis of the direction and magnitude of shunting, and evaluation of ventricular chamber hypertrophy and pulmonary pressure. Further investigations such as electrocardiography and chest X-rays may provide supporting evidence. Management depends on the type and size of the defect, clinical presentation, significance of shunt, pulmonary pressure, and associated cardiac anomalies. Lesions that are minor and of little clinical importance may require only periodic surveillance, whereas those that are hemodynamically important may be amenable to transcatheter device closure or surgical repair. Early diagnosis and appropriate action can improve quality of life, minimize problems and give good long term results. This poster summarizes the types, pathogenesis, clinical symptoms, diagnosis, therapy and prognosis of ASD.

Keywords: *Atrial Septal Defect; Congenital Heart Disease; Left-to-Right Shunt; Echocardiography; Pulmonary Hypertension; Device Closure; Surgical Repair.*

INADDP/PL/OF/57

UNRAVELLING THE MULTI

ISSN: 2584-2781

TARGETED ANTIDEPRESSANT MECHANISM OF FLAVONOIDS: INSIGHTS INTO MOLECULAR SIGNALLING PATHWAYS

Priya Sahani[1], Dr. Ramesh Kr Gupta[1]
Department of Pharmacology, Amity Institute of Pharmacy, Amity University Uttar Pradesh Lucknow Campus Lucknow- 226028, India
Email Id: *psahani@lko.amity.edu*

Abstract:

One of the prevalent mental illnesses is depression, which frequently results in a persistently poor mood, feelings of melancholy or hopelessness, disinterest, or a loss of enjoyment in the majority of daily activities. Depression is a substantial contribution to the global burden of disease and one of the main causes of disability worldwide. Depression is a complex condition with multiple interconnected pathways. Neuroplasticity and synaptic function are hampered by a drop in BDNF. When the HPA axis is overactive, cortisol levels rise, and mood regulation is disturbed. While NLRP3 inflammasome activation causes pyroptosis, which promotes neuronal injury, TLR-4/NF-κB/PPAR-γ activation causes neuroinflammation. In addition, oxidative stress caused by an imbalance between ROS and antioxidants damages neurons and intensifies neuroinflammatory reactions. Furthermore, increased glutamatergic transmission causes excitotoxicity, whereas decreased biogenic amines (such as dopamine and serotonin) impair mood modulation. All of these changes contribute to the development and course of depression; therefore, a multimodal strategy is required. Flavonoids have a variety of pharmacological properties, including antidepressant, hepatoprotective, antioxidant, analgesic, anticonvulsant, and anti-inflammatory effects. This provides a multitargeted defence against depression by modulating the key mediators involved in the pathophysiology of depression, such as BDNF, CREB, NF-κB, TLR-4, NLRP3, HPA, PPAR-γ axis, ROS, serotonin, glutamate, HMGB1, caspases, and SNARE proteins. The current review is designed to investigate the molecular interactions between these pathways in mediating its antidepressant effects, taking into account the possibility of flavonoids in regulating these mediators.

Keywords: *Pyroptosis, Neuronal injury, Neuroinflammation*.

INADDP/PL/OF/58

IMPACT OF PLASTIC AND MICROPLASTIC EXPOSURE ON FEMALE REPRODUCTIVE TOXICITY: EXPLORING THE GUT MICROBIOTA–OVARIAN AXIS LINK

Shree Singh[1], Dr Swati Prakash[1*]
[1]*Department of Pharmacology, Amity Institute of Pharmacy, Amity University Lucknow, Uttar Pradesh, India-226080*

ISSN: 2584-2781

***Email Id*:** sprakash@lko.amity.edu

Abstract:

Plastic pollution has become a critical global concern, with microplastics (MPs) and nanoplastics (NPs) now detected across food, water, air, and human tissues, allowing systemic exposure through ingestion and inhalation. Accumulating evidence indicates that these particles disrupt the gut microbial community, reducing beneficial bacterial populations while promoting pathogenic overgrowth, compromising intestinal barrier integrity, and triggering low-grade systemic inflammation and altered microbial metabolite production. Emerging research further suggests a mechanistic gut microbiota–ovary axis, wherein such dysbiosis and its downstream inflammatory and metabolic signals interfere with ovarian follicular development, steroidogenesis, and oocyte quality. Experimental models exposed to polystyrene and polyethylene microplastics have reported reduced ovarian reserve, disrupted estrous cyclicity, altered estrogen and progesterone levels, elevated oxidative stress, and increased granulosa cell apoptosis, with the severity of reproductive disturbance closely correlating with the extent of gut dysbiosis observed. This review synthesizes current literature on plastic and microplastic-induced reproductive toxicity through the lens of the gut–ovary axis, highlighting proposed mechanisms including intestinal barrier dysfunction, endotoxemia, oxidative stress, and endocrine disruption. Understanding this axis offers novel insight into the rising incidence of unexplained female infertility and opens avenues for microbiota-targeted interventions, such as probiotics and dietary modulation, as potential protective strategies. Further longitudinal and mechanistic studies, particularly in human cohorts, are warranted to establish causality and inform public health guidelines aimed at reducing plastic exposure and safeguarding female reproductive health.

Keywords: *Microplastics; Reproductive Toxicity; Gut Microbiota; Ovarian Axis; Dysbiosis; Oxidative Stress*

INADDP/PL/OF/59

INSULIN AND THE DEMENTED BRAIN: FROM METABOLIC DYSFUNCTION TO NEURODEGENERATION

Harsh Jain [1], Dr. Lucy Mohapatra[1]*

[1]*Department of Pharmacology Amity Institutes of Pharmacy, Amity University,Uttar Pradesh, Lucknow Campus, U.P.,India 226028*

Email Id: lmohapatra@lko.amity.edu; dr.lucymohapatra@gmail.com

Abstract:

Although insulin's primary function in controlling glucose metabolism has long been acknowledged, there is growing

ISSN: 2584-2781

evidence that insulin signalling is also crucial for preserving brain function. Brain insulin resistance, or impaired insulin signalling in the brain, has been identified as a factor in the onset and progression of dementia, especially Alzheimer's disease. In addition to encouraging oxidative stress, neuroinflammation, mitochondrial dysfunction, and aberrant protein accumulation, decreased insulin sensitivity can impair neuronal glucose utilization, synaptic plasticity, learning, and memory. Two of the main pathogenic characteristics of Alzheimer's disease, tau hyperphosphorylation and amyloid-β metabolism and clearance, may also be affected by altered insulin signalling. Thus, it may be possible to find new biomarkers and treatment targets by understanding the connection between insulin resistance and dementia.

Keywords: *Insulin resistance; Brain insulin signaling; Dementia; Alzheimer's disease; Neurodegeneration; Oxidative stress; Neuroinflammation.*

INADDP/PL/OF/60

MICRONEEDLE ASSISTED TRANSDERMAL DRUG DELIVERY : EVALUATE THE MICRONEEDLE APPROACH FOR IMPROVING THE DRUG PERMISSION THROUGH TOPICAL DELIVERY

Qazi faiza[1], Dr. Satya Prakash Singh*[1]

[1]*Department of Pharmaceutics, Amity Institute of Pharmacy, Amity University Lucknow Campus, Uttar Pradesh, India-226028*

Email Id: *spsingh@lko.amity.edu* .

Abstract:

Microneedle technology has gained large interest as an innovative biomedical device to deliver molecule to the targeted ɜite through the skin layers. Microneedle consists of macroscale needle with a specific length about 0.1–1 mm. In comparison to conventional transdermal delivery approaches, the microneedle technique has several advantages including minimal invasivore, pain lee and convenient administration, with higher patient compliance. Microneedle are categorized into several type such as solid microneedle, coated microneedle, hollow microneedle, violable microneedle, hydrogel microneedle, well able microneedle, and porous microneedle. Microneedle can be made of different material, and may vary in size and form. They may also vary in design depending on composition, manufacturing process and area of application. Silicon, stainless steel, polymer, coating material, biodegradable material, several relinking technique and bio sensing device are used to fabricate microneedle. can be employed as a leading novel technology for drug administration, vaccination, cosmetic, diagnostic, cancer studies, and wound care. This review narrates the fabrication

ISSN: 2584-2781

technique of microneedle alongside its application in drug delivery and biomedical field including sensory application.

Keywords: *Span core technology; Structural Classification; Material*.

Pharmaceutics & allied branches

ISSN: 2584-2781

INADDP/PT/ON/01-O

DEPRESSION-ASSOCIATED COGNITIVE DYSFUNCTION: EMERGING NANOTECHNOLOGY-BASED STRATEGIES FOR BRAIN-TARGETED THERAPEUTICS

Ananya Mishra[1]
Department of Pharmaceutics, United Institute of Pharmacy, Naini, Prayagraj, India.

Abstract:

Depression is a multifaceted neuropsychiatric disorder frequently associated with cognitive dysfunction, including impaired attention, working memory, learning and memory retrieval. Increasing evidence indicates that neuroinflammation, oxidative stress, hypothalamic–pituitary–adrenal axis dysregulation, impaired neurogenesis and altered neuroplasticity contribute to depression-associated cognitive impairment, particularly through dysfunction of hippocampal and neuronal networks. Conventional pharmacotherapy may be limited by delayed therapeutic response, systemic adverse effects and inadequate drug concentrations at specific brain targets. Nanotechnology-based drug delivery systems offer promising approaches to overcome these limitations by improving drug stability, bioavailability, controlled release and brain targeting. Various nanocarriers, including liposomes, polymeric nanoparticles, solid lipid nanoparticles, nanostructured lipid carriers, nano emulsions and extracellular vesicles, have been explored for central nervous system drug delivery. Recent studies suggest that functionalized and cell-targeted nanocarriers may help modulate neuroinflammation, oxidative stress and synaptic dysfunction, while intranasal and receptor-mediated delivery strategies may enhance drug transport to the brain. Despite these advances, most evidence remains preclinical, with challenges involving long-term safety, biodistribution, reproducibility, manufacturing scale-up and clinical translation. Integrating nanotechnology with mechanism-based and precision therapeutic approaches may therefore provide a promising next-generation strategy for addressing depression-associated cognitive dysfunction and improving targeted treatment outcomes.

Keywords: *Depression, Cognitive dysfunction, Memory impairment, Neuroinflammation, Nanotechnology, Brain-targeted drug deliver.*

INADDP/PT/ON/02-O

Recent Advances in Nanocarrier-Based Transungual Drug Delivery for the Management of Onychomycosis

Nain Patel[1], Ms. Swathi Gariganti[2]*
Department of Pharmaceutical Technology, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara, Gujarat, India

Abstract:

ISSN: 2584-2781

Onychomycosis is a common fungal infection of the nail, and it is a therapeutic challenge because the nail plate is dense and is composed of a relatively tightly packed layer of highly keratinized cells that prevents effective penetration of the drugs used to treat the infection. Topical antifungal tablets do not penetrate nail well and prolonged therapy is necessary; and systemic therapy could have adverse effects and interactions with other medications. Transungual drug delivery is thus becoming an attractive means to enhance targeted antifungal treatment. In recent years, various nanocarrier systems such as liposomes, nanoemulsions, polymeric nanoparticles, solid lipid nanoparticles, and nanostructured lipid carriers (NLCs) have been developed and introduced to improve the solubility, loading capacity, penetration, and retention of the drugs, and to control their release rates. Of these, NLCs have attracted a significant interest owing to their potential to enhance the incorporation of drug and to offer prolonged drug release. Application of nanocarriers in nail lacquer formulation can also improve the in-use time of the device on nail surface and drug localized delivery for extended duration. This review focuses on the most significant problems with the currently available therapies for onychomycosis and then summarizes the nail barrier layer, recent advancements in utilizing nanocarriers to target the nail, formulation approaches, evaluation parameters, problems, and future thoughts.

Keywords: *Onychomycosis, Transungual drug delivery, Nanocarriers, Nanostructured lipid carriers, Antifungal therapy, Nail lacquer*

INADDP/PT/ON/03-O

FROM NATURE TO NANOMEDICINE: BIOINSPIRED NANOCARRIERS FOR PRECISION AND TARGETED DRUG DELIVERY

Devanshi Jaiswal[1], Swathi Gariganti[2]*
Department of Pharmaceutics, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara, Gujarat, India

Abstract:

Nature provides sophisticated strategies for selective transport, cellular communication, immune evasion, and site-specific delivery that can inspire the development of next-generation drug delivery systems. Conventional nanocarriers have demonstrated considerable potential for improving drug solubility, stability, bioavailability, and therapeutic efficacy; however, limitations related to biological barriers, nonspecific distribution, premature drug release, and off-target effects continue to restrict their clinical translation. Bioinspired nanocarriers represent an emerging approach that integrates principles and components derived from biological systems with advanced nanotechnology to achieve more efficient and precise drug delivery. This review highlights recent advances in bioinspired

ISSN: 2584-2781

nanocarriers, including cell membrane-coated nanoparticles, extracellular vesicle-inspired systems, biomimetic lipid and protein-based carriers, and nature-inspired multifunctional nanoplatforms. Particular emphasis is placed on their ability to mimic biological interfaces, enhance circulation stability, facilitate tissue and cellular targeting, overcome physiological barriers, and provide controlled or stimuli responsive drug release. The role of surface engineering, ligand-mediated targeting, endogenous biological recognition, and disease-specific microenvironment responsiveness in improving therapeutic precision is also discussed. Furthermore, current challenges involving manufacturing complexity, scalability, stability, safety, immunogenicity, regulatory requirements, and reproducibility are considered. Integrating biological principles with nanomedicine may provide a powerful platform for developing patient-centric and targeted therapies with improved therapeutic outcomes and reduced systemic toxicity. Future research should focus on rational biomimetic design, standardized evaluation, advanced manufacturing, and translational studies to bridge the gap between laboratory innovation and clinically effective precision nanomedicine.

Keywords: *Bioinspired nanocarriers, Biomimetic nanomedicine, Targeted drug delivery, Precision medicine, Nanotechnology, Drug delivery systems*

INADDP/PT/ON/04-O

NEXT-GENERATION BIOINSPIRED NANOCARRIERS FOR TARGETED ORAL MUCOSAL DRUG DELIVERY

Natasha Senapati[1], Khushboo Lavania[2]*
Department of Pharmaceutics, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, P.O. Limda, Ta. Waghodia–391760, Dist. Vadodara, Gujarat, India.

Abstract:

The oral mucosa is a promising site for localized drug delivery due to its accessibility, rich blood supply, and potential to provide prolonged therapeutic effects. However, conventional oral mucosal formulations face several limitations, including salivary washout, short residence time, poor drug penetration, and rapid clearance from the application site. Bioinspired nanocarriers have emerged as an innovative approach to overcome these challenges by mimicking the structural and functional characteristics of natural biological systems. These systems include cell membrane-coated nanoparticles, exosome-based nanocarriers, protein- and peptide-based nanoparticles, and biomimetic lipid carriers. Bioinspired nanocarriers can improve drug localization and retention at the oral mucosal surface while protecting therapeutic agents from degradation. Their nanoscale properties can enhance interaction with mucosal

ISSN: 2584-2781

tissues and facilitate cellular uptake. Surface functionalization with specific biomolecules or ligands may further improve targeting and promote site-specific drug delivery. In addition, these nanocarriers can provide controlled and sustained drug release, thereby improve therapeutic effectiveness and reduce unnecessary drug exposure. They have potential applications in the treatment of oral candidiasis, periodontitis, oral ulcers, oral mucositis, and other localized oral disorders. Stimuli-responsive bioinspired systems can further enhance therapeutic precision by releasing drugs in response to specific biological conditions such as pH, enzymes, or reactive oxygen species. Despite their potential, challenges related to stability, reproducibility, manufacturing, safety, and regulatory approval remain. Future research focusing on multifunctional nanocarriers, artificial intelligence-assisted design, and personalized delivery may further improve their performance. Overall, bioinspired nanocarriers represent a promising strategy for targeted and controlled drug delivery to the oral mucosa.

Keywords: *Bioinspired nanocarriers; Oral mucosal drug delivery; Targeted delivery; Biomimetic systems; Mucoadhesion; Nanomedicine; Controlled release; Oral diseases*.

INADDP/PT/ON/05-O

BIOINSPIRED MICRONEEDLE SYSTEMS FOR PEPTIDE DELIVERY: FROM INNOVATIVE DESIGN TO CLINICAL TRANSLATION

Marjita Chakma[1], Dr. Anindita De[2]*
Department of Pharmaceutics, College of Pharmacy, JSS University, Noida, Uttar Pradesh

Abstract:

Peptide-based therapies have transformed the management of chronic illnesses such as diabetes, cancer, and cardiovascular problems, owing to their remarkable specificity, effectiveness, and little toxicity. Nonetheless, their therapeutic efficacy is frequently impeded by obstacles such as inadequate bioavailability, fast enzymatic breakdown, and restricted systemic stability. Conventional delivery strategies, such as oral and intravenous injection, have considerable constraints in efficiently transporting peptides to target locations. Transdermal drug delivery system, especially microneedles (MNs) and bioinspired microneedle (BMNs) have garnered considerable interest as a less invasive and effective option to surmount these obstacles. MNs form microchannels in the dermis, facilitating the direct administration of peptides into systemic circulation, hence improving patient adherence and reducing adverse effects. Recent improvements in BMNs technology have enhanced peptide delivery through better mechanical strength, controlled release, and biocompatibility. This work mainly focuses on the importance of peptide

ISSN: 2584-2781

medicines, the obstacles related to their administration, and the potential of BMNs as an effective transdermal method. We emphasize current advancements in BMNs that improve peptide stability, permeability, and therapeutic effectiveness, facilitating their practical use in the treatment of chronic and acute disorders.

Keywords: *Peptides, Microneedle, Bioinspired microneedle, Bio mimic, Transdermal*

INADDP/PT/ON/06-O

FLAVONOID–SILVER COMPLEX: ENGINEERING A MULTIFUNCTIONAL METAL-BASED THERAPEUTIC FOR NEXT-GENERATION CANCER TREATMENT

Kishan Thumbar[1], Aditya Singh[2]* *Department of Pharmaceutics, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara, Gujarat, India.*

Abstract:

Cancer remains a major health issue worldwide, for their treatment it needs better and targeted therapeutic solutions rather than the conventional treatments and chemotherapy. Flavonoids are a group of compounds that come from plants and are known for their antioxidant, anti-inflammatory, and anticancer properties. However, their application is limited by various issues, such as low aqueous solubility, instability and rapid metabolism. Metal complexation, particularly with silver, represents a promising approach for engineering flavonoid-based therapeutic systems with enhanced physicochemical and biological characteristics. Flavonoid-silver complexes can serve as next generation of treatment for cancer. Interaction of flavonoids with silver ions can alter their characteristics, which can result in better absorption of the drug, improved stability, and higher activity. The silver complex is made by controlled metal-ligand interaction, followed by various characterization process like UV-vis spectroscopy, FTIR, X-rays diffraction, thermal analysis, particle-size analysis, surface-charge measuring, and the morphology of the particles. At the end, anticancer and antioxidant activity of the created substances will be studied through in-vitro tests, such as the assessment of the level of viability by cell line study and measuring the IC_{50} value. Flavanoid-silver complex may exert anticancer effect by modulating various pathways involve in mitochondrial dysfunction, apoptosis induction, oxidative stress modulation and cell cycle regulation. in conclusion flavonoid–silver complexation is a promising approach that combines the natural anticancer potential of flavonoids with the unique properties of silver. This strategy may help develop novel metal-based nanocomplexes with improved therapeutic potential for cancer treatment.

Keywords: *Flavonoids, Cancer Therapy, Silver Nanocomplex, Metal-Silver*

ISSN: 2584-2781

Complex, Nanotechnology

INADDP/PT/ON/07-O

NANOTECHNOLOGY-ENABLED PRECISION PULMONARY DRUG DELIVERY FOR NON-SMALL CELL LUNG CANCER

Parth Sonani[1], Dr. Rupalben K. Jani[2]*
[1]Department of Pharmaceutical Technology, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul Univerisity, Limda, Waghodia, Vadodara,391760, Gujarat, India
[2] Department of Pharmaceutics, Faculty of Pharmacy, Parul Univerisity, Limda, Waghodia, Vadodara,391760, Gujarat, India*

Abstract:

Although non-small cell lung cancer (NSCLC) is still a major cause of cancer related death better and targeted therapeutic strategies are required neither is conventional systemic chemotherapy often associated with poor concentration of drug at the tumour site nor is it associated with dose-limiting toxicity or nonspecific distribution the use of nanotechnology in precision pulmonary drug delivery would provide important advantages for localized delivery of therapeutic agents to the lungs increased solubility stability of the drugs and improved cellular uptake controlled release and targeting to tumors the main focus of this presentation is advanced nanocarriers liposomes polymeric nanoparticles lipid nanoparticles nano-in-micron dry powder system for inhaled treatment of nsclc disease special focus is given to particle size the use of surface engineering with particles the aerodynamic performance deposition in the lungs penetration into the bronchial tissue and receptor-mediated directed cell-targeting of particles lastly the possibility of combining biomarker guided targeting therapy with combination therapy could help personalized treatment strategies by targeting tumor heterogeneity and the intricate tumor microenvironment while these benefits exist formulation stability aerosolization efficiency or device compatibility scalable and safe production and regulatory translation issues are significant challenges there is a general consensus that the combination of nanotechnology and precision pulmonary delivery looks promising to enhance drug delivery to diseased lung tissue minimize unwanted systemic side effects and develop better personalized treatment strategies as also for NSCLC.

Keywords: *Nanotechnology; NSCLC; precision pulmonary drug delivery; inhaled nanoparticles; targeted drug delivery; nanomedicine.*

INADDP/PT/ON/08-O

AI-DRIVEN NANOCARRIER DESIGN FOR PERSONALIZED DRUG DELIVERY: INTEGRATING MACHINE LEARNING WITH

ISSN: 2584-2781

FORMULATION OPTIMIZATION

Nidhi Radadiya[1], *Khushboo Lavania*[2]
[1]*Department of Pharmaceutical Technology, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Limda, Waghodia, Vadodara,391760, Gujarat*.

Abstract:

Although multidimensional interactions between formulation composition-process parameters, physicochemical properties and biological performance often complicate the development of nanocarrier-based drug delivery systems, the systems have enormous potential to enhance therapeutic efficacy, bioavailability, targeted delivery and controlled drug release. Traditional trial and error methods can thus be time-consuming, resource-intensive, and inefficient. Artificial intelligence (AI) and in particular machine learning (ML) offer a data-driven approach to rational design of nanocarriers and optimization of their formulation. The current review examines the new application opportunities of AI and ML in the field of nanomedicine, focusing on the prediction of important aspects of quality parameters such as particle size, polydispersity index, surface properties, drug loading capacity, encapsulation efficiency, stability and drug release behaviour. By leveraging machine learning, formulation optimization can be optimized to uncover intricate non-linear interactions between formulation parameters and drug delivery efficacy, and can also be used to aid multi-objective optimization to obtain desired parameters for drug delivery nanocarriers with minimum experimentation. In addition, novel methods such as deep learning, Bayesian optimization, predictive modelling and inverse design further aid systematic exploration of the nanocarrier design space. Personalized nanotherapeutics can be developed with the assistance of integration with Quality by Design (QbD), pharmacokinetic modelling, and patient-specific datasets. However, several key hurdles to clinical translation include limited high-quality data sets, lack of interpretability in models, external validation, biological complexity, scalability, and changing regulations. In summary, AI-driven nanocarrier design offers a promising avenue for revolutionizing the field of empirical formulation and shifting the paradigm towards more predictive, efficient, and patient-centric drug delivery.

Keywords: *Artificial intelligence, Machine learning, Nanocarriers, Formulation optimization, Personalized drug delivery, Precision nanomedicine.*

INADDP/PT/ON/09-O

NEXT-GENERATION THERAPEUTICS: INTEGRATING NANOTECHNOLOGY WITH ADVANCED DRUG DISCOVERY PLATFORMSTARGETING THE SPLEEN: AN UNDEREXPLORED

ISSN: 2584-2781

FRONTIER IN DRUG DELIVERY

Pratiksha Sabalea b, Suneela Dhaneshwara*

a Amity Institute of Pharmacy, Amity University Maharashtra, Mumbai-Pune Expressway, Bhatan, PO-Somathane, Panvel, Mumbai, Maharashtra, 410206, India

b Dnyaan Prasad Global University School of Pharmacy and Research, Sant Tukaram Nagar, Pimpri, Pune 411018

Abstract:

The spleen is a central immunological organ that plays a critical role in systemic immune surveillance, antigen processing, and immune response modulation. Despite its therapeutic importance, selective drug delivery to the spleen remains underexplored and challenging. Thereview explores the relationship between the spleen's structural characteristics, the design strategies of emerging drug delivery platforms, and their influence on selective delivery to the spleen. The spleen's specialized architecture, including distinct vascular compartments and diverse immune cell populations, offers opportunities to target immune responses, vaccine delivery, gene therapy, and immunotherapy. However, rapid blood filtration, complex microanatomy, heterogeneous cell populations, and biological barriers pose major challenges for efficient, selective spleen targeting. Conventional delivery systems, including liposomes, lipid nanoparticles, and antibody–drug conjugates, primarily depend on passive accumulation, physicochemical properties, or size-dependent retention. Recent advances have introduced innovative platforms such as nanovaccines, zwitterionic and phospholipidated polymers, and RNA-based carriers, which enhance splenic delivery through biomimetic strategies, ligand engineering, and programmable material design. This review further discusses key design parameters, targeting mechanisms, therapeutic applications, and translational challenges associated with spleen-targeted delivery systems. Advances in nanotechnology, combinatorial chemistry, and artificial intelligence-driven carrier design are creating opportunities for more precise, scalable, and selective therapeutic platforms. Addressing challenges related to safety, manufacturability, scalability, biodistribution, and regulatory requirements will be essential for clinical translation. Overall, spleen-targeted drug delivery represents a promising frontier in precision therapeutics, with the potential to enable next-generation immunotherapies, vaccines, and gene-based treatments for infectious, inflammatory, and immune-related disorders.

Keywords *Nanomedicine, Immune cell-specific targeting, Hybrid delivery platforms, Systemic immunotherapy, mRNA vaccine delivery system*

INADDP/PT/ON/10-O

AI-ENABLED MULTI-OMICS-GUIDED NANOSPONGES FOR

ISSN: 2584-2781

PRECISION DRUG DELIVERY: OPPORTUNITIES AND TRANSLATIONAL CHALLENGES

*Reetu**
College of Pharmacy, Integral University, Lucknow

Abstract:

Precision drug delivery aims to improve therapeutic efficacy by matching treatment strategies with disease-specific biological characteristics. However, conventional nanocarrier development often relies on standardized formulations rather than patient-specific molecular information. Multi-omics-guided nanosponges offer an emerging approach to address this limitation. Genomic, epigenomic, transcriptomic, proteomic, metabolomic and metagenomic information can potentially guide the selection of therapeutic payloads, targeting ligands, crosslinking chemistry and stimulus-responsive release mechanisms. Nanosponges possess tunable polymeric or cyclodextrin-based networks. These networks can accommodate diverse drug payloads and respond to disease-associated stimuli. Such stimuli include pH, redox conditions, enzymes, and microbiota-derived signals. The reviewed evidence supports the feasibility of pH-, enzyme-, redox- and dual-stimulus-responsive nanocarrier systems. However, much of the available evidence remains preclinical. Several reported studies also involve nanocarriers other than nanosponges. Artificial intelligence and machine learning may further strengthen this approach. They can assist in integrating complex multi-omics datasets and identifying biologically relevant features. They may also help predict formulation performance relationships and reduce the formulation design space.

Advanced approaches such as multi-omics factor analysis, graph-based learning, generative models, digital twins and adaptive optimization may support personalized formulation development. Nevertheless, direct experimental validation linking patient-specific multi-omics signatures with nanosponge-specific formulation parameters remains limited. Major translational challenges include biological signal validation, data heterogeneity, delivery efficiency, manufacturing reproducibility, safety, regulatory requirements, and clinical validation. Overall, multi-omics-guided nanosponges represent a promising direction for precision drug delivery. Future research should integrate computational prediction with experimental validation and adaptive therapeutic design.

Keywords: *Multi-omics, Nanosponges, Precision drug delivery, Stimuli-responsive nanocarriers, Personalized medicine*

INADDP/PT/ON/11-O

NEXT-GENERATION ALZHEIMER'S THERAPEUTICS: BIOACTIVE COMPOUND-LOADED NANOSTRUCTURED LIPID

ISSN: 2584-2781

CARRIERS FOR INTRANASAL NOSE-TO-BRAIN DELIVERY

Rishabh Chaurasiya, Satya Prakash Singh*, Ankur Srivastava
Research Scholar, Amity Institute of Pharmacy. Amity University Uttar Pradesh, Lucknow
*Professor, * Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow*
Head of Department, Institute of Pharmacy, Dr. Ram Manohar Lohia Avadh University, Ayodhya, Uttar Pradesh

Abstract:

Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by cognitive decline, amyloid-β accumulation, tau pathology, neuroinflammation, oxidative stress, mitochondrial dysfunction, and neuronal loss. Despite the therapeutic potential of several bioactive compounds, their clinical translation is frequently constrained by poor aqueous solubility, chemical instability, rapid systemic metabolism, limited bioavailability, and inadequate penetration across the blood–brain barrier (BBB). Intranasal nose-to-brain delivery represents a promising non-invasive strategy to enhance central nervous system exposure by exploiting olfactory and trigeminal pathways while partially circumventing the BBB. Nanostructured lipid carriers (NLCs), comprising a mixture of solid and liquid lipids, provide a versatile platform for incorporating poorly water-soluble bioactive compounds, improving their physicochemical stability, modulating release, and potentially enhancing nasal retention and brain targeting. Preclinical investigations have demonstrated encouraging outcomes with NLC-based delivery of neuroprotective compounds. Curcumin-loaded NLCs have shown enhanced brain accumulation compared with free curcumin and conventional lipid nanoparticles, while intranasal NLC formulations containing rivastigmine have demonstrated enhanced brain distribution and pharmacodynamic activity. More recently, intranasal quercetin-loaded NLCs have demonstrated improved cellular uptake, inhibition of amyloid-β accumulation, antioxidant and anti-inflammatory effects, and improved cognitive performance in an experimental AD model. Similarly, co-loaded donepezil–astaxanthin NLCs have exhibited anti-amyloidogenic, antioxidant, anti-inflammatory, anti-apoptotic, and cognitive benefits in AD-like rats. The next generation of these systems is moving toward quality-by-design optimization, surface engineering, mucoadhesion, controlled release, and pharmacokinetically validated brain targeting. Recent PEGylated NLC and donepezil-NLC studies further support the feasibility of systematically engineering lipid nanocarriers for intranasal CNS delivery. Collectively, bioactive compound-loaded NLCs represent a promising platform for improving nose-to-brain delivery and addressing multiple pathological mechanisms of AD. Nevertheless,

ISSN: 2584-2781

reproducible nasal deposition, long-term safety, scale-up, device compatibility, and translation from animal models to humans remain critical challenges before clinical implementation.

Keywords: *Alzheimer's disease; nanostructured lipid carriers; bioactive compounds; nose-to-brain delivery; blood–brain barrier; brain targeting; nanomedicine.*

INADDP/PT/ON/12-O

ELECTROSPUN NANOFIBERS ENABLED METALLIC ORGANIC FRAMEWORK FOR ENHANCED WOUND HEALING

Shreya Singh, Narahari Narayan Palei
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus Lucknow 226028
Email: *shreya.singh87@s.amity.edu, nnpalei@lko.amity.edu*

Abstract:

Wound healing is a complex and dynamic biological process involving a coordinated sequence of hemostasis, inflammation, proliferation, and tissue remodeling. Conventional wound dressings often provide limited control over the wound microenvironment and may not adequately support sustained therapeutic activity. In recent years, electrospun nanofibres have emerged as promising wound-dressing platforms because of their high surface-area-to-volume ratio, interconnected porous structure, tunable morphology, and ability to mimic the extracellular matrix. Metal–organic frameworks (MOFs), a class of porous crystalline materials composed of metal ions or clusters coordinated with organic ligands, have attracted considerable attention for biomedical applications due to their high surface area, tunable pore size, drug-loading capacity, and potential antibacterial and bioactive properties. Integrating MOFs with electrospun nanofibres can provide a multifunctional platform for controlled drug delivery while maintaining a favourable wound-healing environment. The resulting nanofibrous scaffold may enhance moisture management, facilitate gas exchange, inhibit microbial infection, and provide sustained release of therapeutic agents at the wound site. Furthermore, the incorporation of bioactive metal ions from MOFs may contribute to antimicrobial activity and tissue regeneration. This approach therefore offers a promising strategy for developing advanced wound dressings that combine the structural advantages of electrospun nanofibres with the functional properties of MOFs. Electrospun MOF-enabled nanofibrous scaffolds have the potential to improve therapeutic efficacy and accelerate wound repair, particularly for challenging wounds that require controlled drug delivery and enhanced antimicrobial protection.

Keywords*: Electrospun, Nanofibrous scaffolds, Metal–organic frameworks*

ISSN: 2584-2781

(MOFs), Wound healing

INADDP/PT/ON/13-O

ANTIBIOTIC DELIVERY SYSTEMS USING LIPOSOMES: A POTENTIAL NANOTECHNOLOGICAL APPROACH FOR COMBATING ANTIMICROBIAL RESISTANCE

Rajshree Tung[1], Nimisha*

*Professor, Department of Pharmaceutics

Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow 226028 (India)

Email *- rajshree.tung@s.amity.edu nsrivastava3@lko.amity.edu*

Abstract:

In the field of drug delivery liposomes have proven their versatility in encapsulating hydrophilic, hydrophobic and amphiphilic compounds which helps to improve the field of pharmaceutical therapy. They are able to cross the pharmacokinetic barriers such as poor solubility, systemic toxicity and fast clearance which makes them potential carriers for antibiotics against antimicrobial resistance (AMR). This review outlines the development of liposomes, their versatility in structure and function and their use in the clinics as therapeutics. Classic preparation techniques like thin-film hydration, ethanol injection and reverse-phase evaporation are explained as well as new microfluidic techniques that offer enhanced scalability, reproducibility and manufacturing control. Recent progress in stimuli-responsive liposomes and hybrid liposomes provides improved targeting of resistant pathogens and biofilms, especially with the addition of nanotechnology. The review also examines molecular mechanisms contributing to AMR, conventional antibiotic treatments and new strategies aimed at combating these challenges. Liposomal systems, nano-systems, stimuli-responsive systems, antibody-drug conjugates and CRISPR-Cas systems are all promising strategies for combating infections involving multidrug-resistant pathogens and biofilm-associated infections. The slow release and controlled release of the drugs can extend the antimicrobial activity and may lead to less toxicity and better therapeutic effects. Despite the biocompatibility concerns, scalability, stability and regulatory issues, the performance of liposomes is improving due to the advancement in the field of materials science and standardized manufacturing methods. In conclusion, liposome-mediated antibiotic delivery is a promising next-generation approach to the management of AMR, from the laboratory to clinical translation and the urgent need of addressing the global burden of drug-resistant infections and the outlook of effective treatment.

Keywords: *Antimicrobial resistance; Liposome-based drug delivery; Nanotechnology; Targeted antibiotics*

ISSN: 2584-2781

INADDP/PT/ON/14-O

IN SITU GELLING SYSTEM FOR GASTRIC RETENTION AND SUSTAINED DRUG RELEASE

Km.Priya, Dr. Poonam Parashar*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow -226028, INDIA
Corresponding Author – pparashar@lko.amity.edu
Presenting Author – kpriya@lko.amity.edu

Abstract:

Gastroretentive drug delivery systems are designed to prolong the residence time of a dosage form in the stomach, thereby improving drug absorption, therapeutic efficacy, and patient compliance. In situ gelling systems have emerged as a promising approach because they are administered as liquids and undergo sol–gel transformation after reaching the gastric environment. This transformation may be triggered by changes in temperature, pH, or ionic composition, resulting in the formation of a viscous, floating, or bioadhesive gel that remains in the stomach for an extended period. The present work focuses on the development of a gastroretentive in situ gelling system using suitable polymers capable of providing rapid gelation, prolonged gastric retention, controlled drug release, and acceptable physicochemical properties. The formulation is evaluated for appearance, pH, viscosity, gelling capacity, floating behavior, drug content, in vitro drug release, and stability. The system is expected to provide sustained drug release, reduce dosing frequency, minimize fluctuations in plasma drug concentration, and enhance the bioavailability of drugs absorbed primarily from the upper gastrointestinal tract. Thus, gastroretentive in situ gelling systems represent a versatile and patient-friendly platform for improving the delivery of drugs with narrow absorption windows, short half-lives, or poor gastrointestinal residence times. The system undergoes sol-to-gel transformation under gastric physiological conditions, forming a localized gel depot that enhances gastric residence, improves mucosal contact and provides controlled release.

Keywords- *Residence time, sol-gel, Bioadhesive gel, prolonged retention, Gastroprotective*

INADDP/PT/ON/15-O

ION-ACTIVATED IN SITU GEL PLATFORM FOR ENHANCED OCULAR DELIVERY OF CO-TRIMOXAZOLE: A QBD-DRIVEN SMART DELIVERY APPROACH FOR NEXT-GENERATION ANTIMICROBIAL THERAPEUTICS

Authors: Asra Azmi1, Swati Sharma2, Mohd Ahmad1, Juber Akhtar1, Mohammad Javed Ansari1.*
1Department of Pharmacy, Integral University, Lucknow, India.

ISSN: 2584-2781

2Department of Biosciences, Integral University, Lucknow, India.
**Corresponding Author: Mohammad Javed Ansari; Email: mjansari@iul.ac.in*

Abstract:

Ocular infections pose significant treatment challenges due to anatomical barriers, rapid nasolacrimal clearance, and poor bioavailability of conventional eye drops. In this research we have formulated and evaluated an innovative ion-activated in situ gelling system for better ocular delivery of Co-trimoxazole against prevalent ocular pathogens. Fifteen formulations were developed and optimized using Box-Behnken experimental design, taking gellan gum (Gelrite®: 0.5-1.5% w/v) as the ion-sensitive gelling polymer, hyaluronic acid (0.1-1% w/v) for mucoadhesion, and Tween 80 (0.1-1% w/v) as a solubilizer. The lead formulation (F7: 1% Gelrite, 1% Tween 80, 0.1% hyaluronic acid) demonstrated immediate sol-gel transition upon contact with simulated tear fluid (STF), forming a robust gel maintaining integrity >10 hours with pseudoplastic rheology (viscosity shift from 54.51 ± 0.11 cps to 1130.29 ± 0.85 cps), optimal pH (7.4 ± 0.14), high clarity, and enhanced mucoadhesive strength (24.3 ± 0.3 dyn/cm²). In vitro release studies showed sustained drug release (82% over 12 hours), a 2-fold increase compared to conventional suspension. Ex vivo permeation studies using goat cornea confirmed significantly higher cumulative drug permeation (143 µg/cm² trimethoprim; 192 µg/cm² sulfamethoxazole at 24 hours). Antibacterial efficacy against Staphylococcus aureus and Escherichia coli exceeded the suspension control, while the formulation met critical ophthalmic requirements: isotonicity (no erythrocyte damage), sterility (no microbial growth in thioglycolate/soybean-casein media), and stability (45 days at 25°C/60% RH and 40°C/75% RH). This optimized in situ gel system is expected to overcome precorneal drug loss, prolong residence time, enhance bioavailability, and provide sustained antibacterial action.

Keywords: *In situ gel, Ocular drug delivery, Gellan gum, Co-trimoxazole, Box-Behnken Design, Mucoadhesion*

INADDP/PT/ON/16-O

NIOSOMAL PHYTOCONSTITUENTS DELIVERY AS A STRATEGY FOR REMODELLING THE WOUND MICROENVIRONMENT

Prachi Pandey1, Narahari Narayan Palei1, Muhammad Arif2
1Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028
2Department of Pharmacy, Faculty of Pharmacy, Integral University, Dasauli, Kursi Road, Lucknow - 226026, Uttar Pradesh, India E-mail: prachi.pandey2@s.amity.edu

ISSN: 2584-2781

Abstract:

Wound healing is a complex biological process involving inflammation, regulation of oxidative stress, angiogenesis, extracellular matrix deposition, collagen remodeling, and re-epithelialization. Excessive reactive oxygen species (ROS), persistent inflammation, impaired angiogenesis, and defective tissue remodeling can disrupt repair and contribute to chronic wound development. Phytoconstituents such as caffeic acid, limonin, curcumin, quercetin, resveratrol, and catechins exhibit antioxidant, anti-inflammatory, antimicrobial, and regenerative properties; however, their therapeutic application is often limited by poor aqueous solubility, instability, rapid degradation, and inadequate retention at the wound site. This study proposes phytoconstituent-loaded niosomes as multifunctional nanocarriers for localized, sustained, and controlled delivery to remodel the pathological wound microenvironment. Niosomes may be prepared using non-ionic surfactants such as Span/Tween derivatives and cholesterol, and then incorporated into a suitable hydrogel matrix. Formulations can be characterized for vesicle size, polydispersity index, zeta potential, morphology, entrapment efficiency, drug loading, physicochemical compatibility, stability, and in vitro release kinetics. Biological evaluation may include antioxidant, cytotoxicity, cellular uptake, antimicrobial, biofilm, and wound-healing assays, while in vivo efficacy can be assessed through wound contraction, histopathology, hydroxyproline content, collagen deposition, and biomarkers including SOD, MDA, TNF-α, IL-6, VEGF, CD34, TGF-β1, and caspase-3. The phytoconstituent-loaded niosomes offer a promising multifunctional nanotherapeutic platform for modulating oxidative stress, inflammation, angiogenesis, collagen remodeling, and re-epithelialization, thereby supporting accelerated and regenerative wound healing.

Keywords: *Niosomes; phytoconstituents; wound healing; ROS; oxidative stress; angiogenesis; collagen remodelling; nanomedicine*.

INADDP/PT/ON/17-O

NANOTECHNOLOGY-ENABLED PHLOROTANNIN'S FOR NEXT-GENERATION WOUND HEALING THERAPEUTICS

Kakli Rai, Poonam Parashar*, Yogesh Kumar

Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus – 226028

Institute of Pharmaceutical Research, GLA University, Mathura, U.P., India, 281406

Abstract:

Wound healing is a complex and highly coordinated biological process involving

ISSN: 2584-2781

inflammation, cell proliferation, angiogenesis, extracellular matrix formation, and tissue remodeling. Delayed or impaired healing can result from excessive oxidative stress, prolonged inflammation, microbial infection, and inadequate tissue regeneration, creating a need for multifunctional and effective therapeutic strategies. Phlorotannin's are a diverse group of polyphenolic compounds characterized by phloroglucinol-based structures and have attracted increasing attention because of their potent antioxidant, anti-inflammatory, antimicrobial, and tissue-regenerative properties. These pharmacological activities suggest that phlorotannin's may serve as promising candidates for the development of advanced wound-healing therapeutics. However, their therapeutic application can be limited by poor aqueous solubility, chemical instability, rapid degradation, and inadequate retention at the wound site. Nanotechnology provides an innovative platform for overcoming these limitations by improving the physicochemical stability, bioavailability, controlled release, and localized delivery of phlorotannin's. Incorporation of phlorotannin's into nanoparticles, nano emulsions, nanogels, nanofibers, liposomal systems, and nanocomposite wound dressings may enhance their therapeutic performance and prolong their interaction with damaged tissue. These advanced delivery systems can facilitate the modulation of oxidative stress and inflammatory responses, inhibit microbial colonization, stimulate fibroblast and keratinocyte activity, promote angiogenesis, and support collagen deposition and extracellular matrix remodeling. Furthermore, nano-enabled formulations may provide sustained drug release and improved therapeutic concentration at the wound site, potentially reducing dosing frequency and enhancing patient compliance. Thus, integrating phlorotannin's with nanotechnology represents a promising next-generation strategy for developing multifunctional wound-healing therapeutics. This approach offers the potential to improve

therapeutic efficacy, optimize localized delivery, and overcome limitations associated with conventional administration of bioactive compounds.

Keywords- *Bioactive compounds, Nanotechnology, Phlorotannin's, Wound healing, Wound regeneration*.

INADDP/PT/ON/18-O

THERANOSTIC "NANO-SWARM" PLATFORM: COMPUTATIONALLY DESIGNED PANCREATIC MICELLES WITH REAL-TIME BIOSENSING FEEDBACK FOR PERSONALIZED DOSING

Pushkar Nanwani1, Kapil Kumar2*
1,2Amity University Uttar Pradesh, Lucknow Campus, INDIA
Email- nanwanipushkar@gmail.com /Kkgupta@lko.amity.edu

ISSN: 2584-2781

Abstract:

Therapies designed to treat diseases related to the pancreas, like PDAC and insulin-dependent metabolic conditions, have faced difficulties due to dense stromal layers, quick drug clearance from the bloodstream, and high pharmacokinetic and response variability between different patients. Traditional nanomedicines based on micelles are limited by their fixed design and constant drug payload regardless of the disease stage and progression, which compromises treatment efficiency and increases adverse effects. In this study, we introduce the concept of "Nano-Swarm", which is based on theranostic micelles for the treatment of pancreatic diseases in the adaptive manner. Our theranostic micelles are derived from a library of micelles with optimized hydrophobic cores and coronas, obtained through molecular dynamics simulation and machine learning surrogate modeling in order to maximize the pancreatic targeting, stromal penetration and payload capacity, regardless of whether the payload is chemotherapy, siRNA/ASO, or insulinotropic drug, and to minimize the systemic clearance through liver and kidneys. Every micelle contains three components: the ligand targeting the pancreas, the molecularly imprinted or aptamer-based sensor specific for a certain disease marker (CA199, PD-L1, glucose, interstitial pH), and the fluorescent dye-quencher reporter for detection of the biomarker. The main principle of Nano-Swarm technology is a sensing-and-delivery network composed of micelles evenly spread within the target tissue and adjusting the payload release in response to changes in biomarker gradients via an optimal Bayesian control algorithm based on the physiology of disease. Instead of passively accumulating within the target, drug delivery becomes a data-driven process, where the dose, timing and combination of micelles change in accordance with the progression of disease. Our proof-of-concept experiments (3D pancreatic tumor-stroma spheroids, orthotopic pancreatic tumors and glucose-responsive diabetes models) demonstrate that our micelles trigger the reporter signal according to the biomarker detected, significantly increase drug delivery to tumor tissue, and result in better tumor control and metabolic regulation compared with conventional micelles, with no observable safety issues. With the combination of computational design, biosensing and adaptive control, the "Nano-Swarm" concept can be applied as a general tool of personalized theranostics for the treatment of various diseases, including pancreas-related ones.

Keywords: *Theranostics, pancreatic micelles, personalized dosing, real-time monitoring, closed-loop nanomedicine, computational nano design, adaptive drug delivery, PDAC, pancreatic biomarkers.*

INADDP/PT/ON/19-O

CHARACTERIZATION TECHNIQUES AND REGULATORY ASPECTS REVIEW FOR

ISSN: 2584-2781

LIPOSOMAL AMPHOTERICIN-B FOR INJECTION.

*Pankaj D Bari[1], Pankaj[2], C Bhamare **
Amity Institute of Pharmacy, Amity University Maharashtra, Mumbai 410206, Maharashtra,India.
Macleods Pharmaceuticals Ltd., Mumbai, Maharashtra 400093.
***Email**- pcbhamare@mum.amity.edu*

Abstract:

Due to the complex structural characteristics and manufacturing process of Liposomal Amphotericin B for Injection, scientists face major challenges in proving therapeutic equivalency against the reference product (AmBisome ®). AmBisome ® is the reference listed drug (RLD), which is used to compare the Test product by assessment of Physicochemical, Analytical, and biological characterization techniques, which are essential to demonstrate quality, safety, and equivalency of the test product against AmBisome ®. Particle size, polydispersity index, zeta potential, morphology, lamellarity, encapsulation efficiency, lipid composition, and in vitro drug release are among the key critical quality attributes (CQAs) that are systematically analyzed in conjunction with the sophisticated analytical techniques used to evaluate them. The review also emphasizes biological evaluation methods that support in vitro–in vivo correlation and therapeutic consistency, including cytotoxicity assays and hemolysis studies. Global requirements for the characterization and approval of liposomal formulations are clarified by summarizing regulatory expectations as stated by the WHO, EMA, and U.S. FDA. Adopting a totalityof-evidence strategy that combines biological and analytical data is emphasized in order to support a strong demonstration of therapeutic equivalency for potential generic L-AmB products. In summary, this review provides an evidence-based framework to help researchers and regulatory experts create and assess liposomal Amphotericin B formulations that are safer, efficient.

Keyword: *Liposome, Amphotericin B, characterization techniques, critical quality attributes; pharmaceutical equivalence*

INADDP/PT/OF/20-O

FORMULATION AND EVALUATION OF URSOLIC ACID LOADED NANO FORMULATION (TRANSFEROSOMES) FOR THE MANAGEMENT OF DERMATOLOGICAL DISORDERS

Rishabh Gupta[1]*
Department of Pharmacy, Faculty of Medical, Para-Medical and Allied Health Sciences; Jagannath University, Jaipur, Rajasthan (303901)

Abstract:

Ursolic acid (UA), which is a naturally

ISSN: 2584-2781

occurring pentacyclic triterpenoid, has a variety of pharmacological properties such as anti-inflammatory, antioxidant, antimicrobial and anticancer effects. Nevertheless, its use as a therapeutic agent is greatly hindered by its poor solubility in water, low bioavailability and limited ability to penetrate the skin. The current research is based on the development and characterization of transferosomes loaded with ursolic acid as a new type of nanovesicular drug delivery system in order to enhance transdermal penetration and increase the therapeutic effectiveness. Because of their highly flexible lipid bilayer and capacity to penetrate biological barriers, transferosomes have great promise in delivering poorly soluble drugs into and through the skin. Transferosomes containing UA will be prepared using a suitable lipid and edge-activator mixture and will be optimised with respect to the various formulation parameters. The formulations thus obtained will be examined for their physicochemical properties, such as vesicle size, polydispersity index, zeta potential, entrapment efficiency, drug content and deformability. In-vitro drug release and ex-vivo skin permeation studies will be carried out to examine the release behaviour and dermal penetration of UA from the optimized formulation. It is expected that incorporating UA into transferosomal nanovesicles will increase the solubilization of the drug, improve skin deposition and permeation, allow for a sustained release drug delivery and reduce limitations linked with conventional topical delivery. The nanotherapeutic method proposed here may therefore represent a promising approach for improving the topical treatment of inflammatory and other dermatological disorders and could form the basis for further preclinical investigations into UA-based nano formulations.

Keywords: *Nanovesicular drug delivery, Transferosomes, Ursolic acid, Transdermal drug delivery, Dermatological disorders.*

INADDP/PT/OF/21-O

PHYSICS-DRIVEN SMART NANOCARRIERS FOR NEXT-GENERATION THERAPEUTICS: INTEGRATING QUANTUM NANOTECHNOLOGY WITH ADVANCED DRUG DISCOVERY PLATFORMS

Prachi Mishra and Usha Shukla
M.Sc. (Applied Physics) Department of Applied Physics, Amity University, Lucknow, India,
Email Id.:*prachimishra7376@gmail.com*

Abstract:

The development of next-generation therapeutics requires innovative approaches capable of overcoming the limitations of conventional drug discovery and delivery systems, including poor bioavailability, non-specific drug distribution, rapid degradation, and limited control over therapeutic response. The integration of

ISSN: 2584-2781

nanotechnology with fundamental principles of physics offers promising opportunities for the development of intelligent and precision-based therapeutic platforms. This work explores the role of physics-driven smart nanocarriers and quantum nanotechnology in advancing modern drug discovery and targeted therapeutic applications. At the nanoscale, materials exhibit distinctive physical properties arising from quantum confinement, enhanced surface-to-volume ratio, tunable optical behaviour, and magnetic responsiveness. These properties can be utilized to design multifunctional nanocarriers capable of efficient drug loading, targeted transport, controlled release, molecular imaging, and real-time monitoring. Quantum dots, magnetic nanoparticles, and hybrid nanostructures provide potential platforms in which physical phenomena such as diffusion, electromagnetic interactions, energy transfer, surface forces, and quantum-scale electronic behaviour can be exploited for therapeutic applications. The proposed framework connects advanced drug discovery platforms with smart nanocarrier engineering. Computational modelling and data-driven approaches can assist in the identification and optimization of potential drug molecules, while nanophysical principles can guide their transport, targeting, and stimulus-responsive release. The integration of diagnostic and therapeutic functions within a single nanosystem further enables the development of theranostic platforms for personalized medicine. This interdisciplinary approach highlights the expanding role of physics in next-generation therapeutics. By combining quantum-enabled nanomaterials with advanced drug discovery technologies, smart therapeutic systems may offer improved precision, enhanced drug efficacy, reduced systemic toxicity, and better real-time monitoring of treatment response. The study emphasizes that the future of therapeutic innovation lies in the convergence of nanophysics, quantum technology, computational drug discovery, and biomedical engineering.

Keywords: *Smart Nanocarriers, Quantum Nanotechnology, Nanophysics, Targeted Drug Delivery, Quantum Dots, Magnetic Nanoparticles, Advanced Drug Discovery, Theranostics, Precision Medicine*

INADDP/PT/OF/22-O

NANO-ENHANCED KIDCOOL-F: A TASTE-MASKED NANOPARTICLE-LOADED FAST-DISSOLVING ORAL FILM FOR PEDIATRIC FEVER MANAGEMENT

Sneha Sharma[1], Ankita Gupta[2], Upasana Singh[3], Priyanka Keshari[4], Akanksha Tiwari[5]*
School of pharmacy, ITM University, Gwalior, Madhya Pradesh ,474001

Abstract:

Effective fever management in pediatric populations remains a significant clinical

ISSN: 2584-2781

challenge due to issues with medicine acceptability and patient compliance. Traditional oral dosage forms often suffer from bitter tastes and swallowing difficulties, leading to dose rejection. This study introduces Nano-Enhanced KidCool-F, an innovative taste-masked, nanoparticle-loaded, fast-dissolving oral film (FDOF) designed to overcome these barriers in pediatric fever management. The present study proposes formulation strategy for a chitosan nanoparticle-loaded, taste-masked, fast-dissolving oral film (KidCool-F), hypothesized to improve palatability, onset of action, and compliance in pediatric fever management. Chitosan, a natural and biocompatible polymer, serves as the core vehicle for the nanoparticle-loaded system. This nano-coating provides a strong mechanism for taste-masking, effectively shielding the bitter drug molecules from the child's taste buds. By integrating these Chitosan-based nanoparticles into a fast-dissolving oral film, the product offers a user-friendly administration method that requires no water and dissolves rapidly upon contact with saliva, minimizing the risk of choking while ensuring a rapid therapeutic onset.The final oral films will be evaluated for appearance, thickness, weight variation, folding endurance, surface pH, disintegration time, drug content uniformity and in-vitro drug release. KidCool-F is conceptualized as an innovative, child-friendly antipyretic delivery platform combining chitosan nanoparticle technology with fast-dissolving films to address taste, swallowability, and dosing accuracy in pediatric medication. Experimental validation is required to confirm feasibility and performance.

Keywords: *Chitosan nanoparticles, Pediatric fever, Fast-dissolving oral film, Taste masking, Antipyretic, Nanotechnology*

INADDP/PT/OF/23-O

INTEGRATED NANOTECHNOLOGY IN DRUG DELIVERY SYSTEMS: ADVANCING TARGETED, CONTROLLED AND NEXT-GENERATION THERAPEUTICS

*Abhishek Pal**

Institute of Pharmaceutical Sciences and Research, Sohramau, Lalpur, Uttar Pradesh 209859, Dr. APJ Abdul Kalam Technical University, Lucknow.
Email- palabhisek537@gmail.com

Abstract:

Traditional drug delivery methods frequently struggle with issues like poor water solubility, premature degradation, and an inability to bypass biological barriers, which can lead to off-target side effects and reduced efficacy. Nanotechnology addresses these critical shortfalls by utilizing incredibly small, highly engineered nanocarriers—typically between 1 and 1000 nanometers—that can transport delicate drugs directly to diseased tissues.

ISSN: 2584-2781

Because these carriers possess a massive surface area and can be customized with specific surface coatings, they dramatically improve a drug's solubility, shield fragile genetic materials, and extend the medicine's circulation time in the bloodstream. This review highlights the diverse toolbox of nanocarriers, including liposomes, lipid nanoparticles, and polymeric micelles, while exploring how they use both passive and active targeting mechanisms to home in on specific cells. We also examine the integration of smart, stimuli-responsive systems that only release the medicine when triggered by specific cues like internal pH changes or externally applied heat, drastically minimizing harm to healthy tissues. While the nanomedicine market is expanding rapidly and expected to double by 2030, translating these breakthroughs from the lab to real-world patients involves overcoming significant manufacturing scale-up, stability, and stringent regulatory hurdles. Ultimately, by joining forces with artificial intelligence and precision medicine, nanotechnology is fundamentally shifting the healthcare landscape from passive treatments to highly responsive, next-generation therapeutics.

Keywords: *Nanotechnology, Targeted Drug Delivery, Nanocarriers, Stimuli-Responsive Systems, Precision Medicine, Pharmacokinetics*

INADDP/PT/OF/24-O

LIPID-BASED NANOCARRIER SYSTEMS FOR ESSENTIAL OILS IN WOUND HEALING: A NEXT-GENERATION NANOTHERAPEUTIC APPROACH

Parmar Manish, Kumar Kantibhai, Manisha Lalan*
Department of Pharmaceutics, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, P.O. Limda, Ta. Waghodia–391760, Dist. Vadodara, Gujarat, India.

Abstract:

Wound healing is a complex and dynamic process involving coordinated inflammatory, proliferative, and remodelling phases, and the development of effective therapeutic strategies remains a significant challenge. Essential oils have emerged as promising natural therapeutics owing to their antimicrobial, antioxidant, anti-inflammatory, and tissue-regenerative activities. However, their therapeutic application is restricted by volatility, poor aqueous solubility, chemical instability, rapid evaporation, and limited retention at the wound site. Lipid-based nanocarrier systems offer a next-generation approach to overcome these limitations by improving the stability, solubilization, controlled release, skin permeation, and localized delivery of essential oils. This review highlights recent advances in lipid-based nanocarriers, including nanostructured lipid carriers, solid lipid nanoparticles, nanoemulsions, liposomes, and lipid nanocapsules, for essential-oil-based wound healing applications. The

ISSN: 2584-2781

therapeutic potential of essential oils is discussed with emphasis on their pharmacological activities, mechanisms of wound healing, and incorporation into advanced nanocarrier systems. Furthermore, formulation strategies, advantages, safety considerations, current challenges, and future translational prospects are explored. Integration of essential oils with lipid nanotechnology represents a promising platform for developing stable, efficient, and innovative nanotherapeutics, potentially enabling improved wound-site delivery and enhanced therapeutic outcomes. Such advanced lipid-based systems may contribute to the development of next-generation therapeutic approaches for effective wound management.

Keywords: *Essential oils, Lipid-based nanocarriers, Nanotechnology, Wound healing, Nanostructured lipid carriers, Nanotherapeutics.*

INADDP/PT/OF/25-O

NANOTECHNOLOGY-INTEGRATED MUCOADHESIVE BUCCAL FILMS: BRIDGING THE GAP BETWEEN DRUG DISCOVERY AND SYSTEMIC THERAPEUTIC DELIVERY

Rath Swagat, Dr KS Rajesh*, Dr Dhaval Pethani, Dr Pradeep Dabhi
Parul Institute of Pharmacy, Parul University, Vadodara, Gujarat, India

Abstract:

However, the systemic bioavailability of poorly water-soluble and highly metabolized drugs is still limited by the conventional oral drug delivery approach, which is hindered by a combination of hepatic first-pass metabolism and dissolution-limited absorption (BCS Class II). While clinically established as a transmucosal drug delivery platform, mucoadhesive buccal films have been shown to have a limited capacity to carry drugs, weak mechanical properties and are not efficient with complex drug molecules due to the low transmucosal flux of such molecules. The use of nanoparticulate carriers in mucoadhesive film matrices overcomes these drawbacks by increasing the aqueous drug solubility due to particle size reduction, the transmucosal flux of the drug by controlling nanocarrier architecture and protection of labile drug molecules from degradation by salivary enzymes. Three nanotechnology platforms integrated with buccal films (nanocrystal-loaded films, solid lipid nanoparticle films, and nanostructured lipid carrier-embedded films) were evaluated, and a systematic critical analysis of peer-reviewed literature was performed to assess the particle properties, flux across the mucosa, and in vivo pharmacokinetic outcomes. The NLC embedded buccal films exhibited 236% relative bioavailability (rabi) in valid in vivo buccal film pharmacokinetic models in rabbits, compared to conventional plain drug film, and 5-fold higher transmucosal flux. Additionally, nanonized deformable nanoparticles in mucoadhesive film matrices exhibited improved buccal permeability and bypassed the hepatic first-pass exposure. All these results

ISSN: 2584-2781

provide a scientifically validated platform for development of next generation therapeutic platforms for enhancing systemic drug delivery using mucoadhesive buccal films integrated with nanotechnology.

Keywords: *Mucoadhesive buccal film, Nanostructured lipid carriers, Nanocrystals, Transmucosal drug delivery, Bioavailability enhancement, BCS Class II*

INADDP/PT/ON/01-P

SMART NANOCARRIERS FOR TARGETED DRUG DELIVERY: THE FUTURE OF PRECISION THERAPEUTICS

Gitesh Dhat[1], Dr. Pinkal Patel[2*], Pratima Patel[3]

[1]*Research Scholar, Department of Regulatory Affairs, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara 391760, Gujarat, India.*

[2]*Professor, Department of Pharmaceutical Chemistry, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara 391760, Gujarat, India.*

[3]*Assistant Professor, Department of Regulatory Affairs, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara 391760, Gujarat, India.*

Abstract:

Smart nanocarriers have recently evolved as novel drug delivery vehicles capable of overcoming certain limitations of traditional drug delivery systems, which include poor bioavailability, lack of targeting, non-specific distribution, and systemic toxicity. This narrative review will discuss the possible role of smart nanocarriers in targeted drug delivery and its implications for advancing precision therapeutics. Scientific literature of the recent years was analyzed to evaluate existing types of nanocarrier technologies such as polymeric nanoparticles, liposomes, dendrimers, micelles, and stimuli-responsive nanocarriers, paying particular attention to targeting methods, drug loading capacity, drug release control and clinical applications. The use of smart nanocarriers may increase solubility, stability, bioavailability, and targeted drug delivery. Both passive and active targeting methods allow accumulating nanocarriers preferentially in the disease affected sites, while stimuli-responsive nanocarriers can help achieve controlled drug release in response to changes in specific conditions, such as pH, temperature, enzymes, and redox conditions. The described properties of smart nanocarriers indicate that they are capable of significantly improving therapeutic results by minimizing side effects. Smart nanocarriers can be regarded as a prospective next generation drug delivery platform that has great potential to revolutionize traditional therapy.

Keywords: *Smart Nanocarriers, Targeted Drug Delivery, Nanotechnology,*

ISSN: 2584-2781

Precision Therapeutics, Nanomedicine, Stimuli-Responsive Systems

INADDP/PT/ON/02-P

ADAPTIVE SURFACE-SWITCHING NANOCARRIERS FOR TARGETED DRUG DELIVERY: NAVIGATING BIOLOGICAL BARRIERS

Kamal Kumar[1], *Rishabh Gupta*[2]*
Faculty of Medical, Para-medical and Allied Health Sciences, Department of Pharmacy, Jagannath University, Jaipur, 303901, Rajasthan, India.
***Email**: kamalkumarv206@gmail.com / rishabh.gupta@jagannathuniversity.org*

Abstract:

The therapeutic efficacy of many drugs is limited by poor stability, low bioavailability, nonspecific distribution, and multiple biological barriers that restrict effective delivery to target sites. Conventional nanocarriers have demonstrated potential for targeted drug delivery; however, their static surface properties may limit their ability to respond to changing biological environments. Adaptive surface-switching nanocarriers have emerged as a promising strategy that enables dynamic modification of surface characteristics during different stages of drug delivery. This review highlights recent advances in surface-switching nanocarriers designed to navigate sequential biological barriers and improve therapeutic delivery. This review discusses various stimuli-responsive strategies, including pH-, enzyme-, redox-, and tumour microenvironment-responsive mechanisms, emphasising their ability to regulate surface charge, expose or conceal targeting ligands, enhance tissue penetration, and facilitate cellular uptake. Current studies indicate that dynamic surface switching can allow nanocarriers to adopt different functional states during circulation, target-site accumulation, cellular internalization, and intracellular drug release. These adaptive systems therefore offer potential advantages in improving target specificity, tissue penetration, cellular uptake, and controlled drug release compared with conventional static nanocarriers. Overall, surface-switching nanocarriers represent an emerging approach for addressing the sequential and dynamic nature of biological barriers. Further research on safety, scalability, manufacturing, and clinical translation is essential to establish their potential as next-generation targeted drug delivery platforms.

Keywords: *Adaptive nanocarriers, surface switching, targeted drug delivery, biological barriers, stimuli-responsive systems, nanomedicine.*

INADDP/PT/ON/03-P

DRUG SHORTAGES AND REGULATORY GAPS AFFECTING MEDICINE AVAILABILITY

Pritam Patel[1], *G.S Chakraborthy* [2*], *Janki Thakkar*[3]
1. Department of Regulatory Affairs,

ISSN: 2584-2781

Parul Institute of Pharmacy and Research, Parul University, P.O- Limda, Waghodia-391760, Gujarat, India
2. Department of Pharmacognosy, Parul Institute of Pharmacy and Research, Parul University, P.O- Limda, Waghodia-391760, Gujarat, India

Abstract:

Drug shortages pose serious threats to treatment continuity and public health when there is not enough of an authorised medication to meet patient demand. Regulatory approval guarantees efficacy, safety, and quality, but it does not always promise that medications will always be available. Therefore, manufacturing and supply-chain issues as well as regulatory deficiencies may be the cause of drug shortages. Essential cancer medications cisplatin and carboplatin were in short supply in 2023, which brought attention to risks brought on by low manufacturing capacity, reliance on a small number of suppliers, manufacturing disruptions, and quality-related problems. This case illustrated how the availability of medications and patient care can be quickly impacted by failure at a small number of manufacturing facilities. Inadequate early-warning systems, restricted visibility of pharmaceutical supply chains, a lack of incentives for manufacturers to maintain reserve capacity, reliance on concentrated suppliers, and delayed communication between manufacturers and regulatory bodies are some of the main regulatory gaps. Current regulatory systems sometimes prioritise product approval and quality over long-term supply resilience. The implementation of mandatory shortage-risk reporting, real-time supply-chain monitoring, early-warning and shortage-prediction systems, enhanced regulatory communication, supplier diversification, incentives for resilient manufacturing, and accelerated regulatory pathways for alternative suppliers are all necessary to close these gaps. Risk-based regulatory frameworks should also be used to identify and track critical medications. A shift from a reactive approval-and-compliance approach to a proactive supply-resilience model is essential. Strengthening regulatory surveillance, manufacturing resilience, transparency, and coordination can help prevent avoidable shortages and ensure that approved medicines remain accessible to patients.

Keywords: *Drug shortages, Regulatory failure, Supply-chain resilience, Regulatory gaps, Medicine availability, pharmaceutical regulation.*

INADDP/PT/ON/04-P

NANOTECHNOLOGY IN DRUG DELIVERY: FROM CONVENTIONAL NON-CARRIERS TO TARGETED AND PRECISION THERAPEUTICS

Priya Tiwari[1], Uma Shankar Maurya[2]*
Department of pharmaceutical chemistry
Goel Institute of pharmacy and sciences, Lucknow Near Indira Canal, Faizabad

ISSN: 2584-2781

Road, Uttar Pradesh India 227105
***Email**: maurya.us@gmail.com*

Abstract:

Nanotechnology has emerged as a promising strategy for transforming conventional drug delivery into targeted and precision therapeutics. Conventional drug delivery often results in broad tissue distribution, limited bioavailability, premature drug degradation, and systemic toxicity. Nanotechnology addresses these limitations through nanoscale carriers that can improve drug solubility, stability, cellular uptake, pharmacokinetics, and tissue distribution. Nanoparticles, generally below 100 nm in at least one dimension, can incorporate therapeutic agents within their matrix or attach them to their surface, enabling controlled and sustained drug release. Various nanocarrier platforms, including liposomes, polymeric nanoparticles, micelles, dendrimers, and inorganic nanoparticles, have been investigated for delivery of anticancer drugs and genetic therapeutics. Recent developments emphasize passive targeting through the enhanced permeability and retention (EPR) effect and active targeting using ligands that recognize specific cellular receptors. These approaches can enhance drug accumulation at diseased sites while reducing off-target toxicity. Nanocarriers have demonstrated applications in delivering drugs such as paclitaxel, doxorubicin, 5-fluorouracil, and dexamethasone, while emerging systems support gene delivery, imagingguided therapy, and theranostics. The integration of biomarker-based patient selection, stimuli-responsive release, multimodal imaging, and multifunctional nanocarriers is advancing the field toward personalized nanomedicine and precision oncology. However, large-scale manufacturing, stability, immunogenicity, long-term safety, cost, and regulatory translation remain important challenges. Overall, nanotechnology offers a pathway from conventional drug delivery toward safer, more selective, and patient-oriented precision therapeutics.

Keywords: *Drug Delivery; Nanocarriers; Nanomedicine; Precision Therapy; Targeted Delivery*

INADDP/PT/ON/05-P

NOSE TO BRAIN DELIVERY FOR MIGRAINE OR PARKINSON TREATMENT: ADVANCES, MECHANISMS, AND THERAPEUTIC POTENTIAL

*Shweta Singh[1], Dr. Snigdha Bhardwaj**
K.I.E.T SCHOOL OF PHARMACY, Delhi- NCR, Ghaziabad-Meerut Road, Ghaziabad-201206, Uttar Pradesh, India,
***Email**- shweta.25181013@kiet.edu /snigdha.bhardwaj@kiet.edu*

Abstract:

Therapies that would otherwise be useful in the treatment of CNS disease have restricted access to the brain due to the blood–brain barrier (BBB), which normally blocks the passage of most

ISSN: 2584-2781

drugs to the CNS. Non-invasive drug delivery to the brain via nasal to brain (N-B) drug delivery has become an area of great interest in recent years as a method for delivering drugs directly to the brain through the olfactory and trigeminal pathways without going through the BBB. This can offer immediate effect, higher drug availability at the central nervous system and decrease systemic side effects. It is especially useful for delivering drugs to the brain in neurological diseases like migraine and Parkinson's disease, where quick and precise drug delivery is important. Therapeutic agents, such as triptans, dopamine related agents and neuroprotective agents, have demonstrated good results in intranasal delivery, and advanced drug delivery systems like nanoparticles and nano emulsions have the potential to enhance drug stability and targeting capabilities. However, there are a number of problems, such as mucociliary clearance, enzymatic degradation and low capacity to load drugs. In conclusion, the present review emphasizes the mechanisms, formulation strategies, recent progress and achievements of nose-to-brain delivery in CNS therapy, which is considered as a promising and effective way to accomplish CNS therapy.

Keywords: *Nose to brain delivery, blood-brain barrier, central nervous system, intra nasal drug delivery, neurological disorders, nano-drug delivery systems*

INADDP/PT/ON/06-P

RNA NANOMEDICINE: REGULATION CHALLENGES AND EMERGING PATHWAYS ADVANCED NANOCARRIERS FOR TARGETED DELIVERY OF MRNA, SIRNA, AND GENE-EDITING THERAPEUTICS

Shahroz Choudhary[1], Dr Kinjal parmar[2]*
*1*Research Scholar, Department of Regulatory Affairs, Parul Institute of Pharmacy & Research, Faculty of Pharmacy, Parul University, Vadodara, Gujarat, 391760, India*
2Assistant Professor, Department of Quality Assurance, Parul Institute of Pharmacy & Research, Faculty of Pharmacy, Parul University, Vadodara, Gujarat, 391760

Abstract:

RNA nanomedicine has progressed from experimental technology to clinically validated therapeutics, supported by nanocarriers that enable the delivery of mRNA, siRNA, and gene-editing components. However, the increasing complexity of these products presents

unique regulatory challenges that conventional pharmaceutical frameworks may not fully address. This review critically evaluates the regulatory landscape for advanced RNA nanocarriers, focusing on lipid nanoparticles (LNPs), biodegradable ionizable lipids, polymeric and

ISSN: 2584-2781

biomimetic systems, and emerging organ-selective delivery platforms. Real-world milestones, including patisiran, the first FDA-approved LNP-formulated siRNA therapeutic, and clinical development of NTLA-2001, an LNP-mediated CRISPR-Cas9 therapy, demonstrate both the feasibility and regulatory complexity of RNA nanomedicines. Particular emphasis is placed on quality-by-design, critical quality attributes (CQAs), physicochemical characterization, potency, encapsulation efficiency, biodistribution, immunogenicity, genotoxicity, off-target effects, stability, and manufacturing consistency. The review further examines challenges in establishing comparability following formulation or manufacturing changes and the difficulty of translating preclinical biodistribution and toxicity findings into clinically meaningful regulatory evidence. Emerging strategies such as organ-selective LNPs, cell-specific targeting and programmable nanocarriers further challenge conventional approaches to characterization, risk assessment and clinical evaluation. The analysis highlights the need for science-based, product-specific regulatory frameworks, harmonized characterization standards, and lifecycle-based safety monitoring to facilitate innovation while protecting patients. Establishing predictable regulatory pathways for complex RNA nanomedicines will be critical for their transition from promising platforms to scalable, safe and globally accessible precision therapeutics.

Keywords: *RNA nanomedicine; lipid nanoparticles; regulatory sciencesiRNA; mRNA; gene editing; critical quality attributes; nanomedicine regulation.*

INADDP/PT/ON/07-P

INTEGRATING DIGITAL THERAPEUTICS AND NANOTECHNOLOGY FOR PRECISION MEDICINE

Bhoomika Jambhore[1], Hiralben Mehta[2], Janki Thakkar[3]*

[1]Research Scholar, Department of Regulatory Affairs, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara 391760, Gujarat, India.

[2]Assistant Professor, Department of Pharmaceutical Quality Assurance, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara 391760, Gujarat, India. Orcid Id:0009-0008-6233-7465*

[3]Assistant Professor, Department of Regulatory Affairs, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara 391760, Gujarat, India.

***Email**: jainbhoomi1228@gmail.com*

Abstract:

Digital therapeutics (DTx) and nanotechnology are emerging technologies with significant potential to advance precision medicine. DTx provides evidence-based, software-driven

ISSN: 2584-2781

interventions that can personalise treatment and continuously monitor patient outcomes, while nanotechnology enables targeted drug delivery, improved bioavailability, and controlled therapeutic release. Their convergence could support more individualised and responsive healthcare; however, it also creates complex regulatory considerations. This review explores the potential integration of DTx and nanotechnology in precision medicine and evaluates emerging regulatory challenges and opportunities associated with their development, clinical evaluation, quality assurance, and post-market monitoring. We conducted a narrative review using peer-reviewed literature and regulatory documents from the US FDA, EMA, CDSCO, and international standards. We assessed literature published between 2019 and 2026 for regulatory requirements related to digital therapeutics, nanomedicines, software as a medical device, clinical evidence, quality, safety, cybersecurity, and lifecycle management. The available evidence was critically analyzed to identify regulatory challenges, opportunities, and gaps associated with integrating digital therapeutics and nanotechnology into precision medicine. Integration of DTx with nanotechnology could enable patient-specific therapeutic delivery, real-time monitoring, adaptive interventions, and improved treatment outcomes. However, regulatory challenges include technology classification, combination-product assessment, validation of digital and nano-enabled components, manufacturing consistency, clinical evidence requirements, data security, algorithmic reliability, and post-market surveillance. A harmonised, risk-based, and lifecycle-oriented regulatory framework is therefore essential to facilitate responsible integration of DTx and nanotechnology while ensuring safety, efficacy, quality, and patient-centric innovation in precision medicine.

Keywords: *Digital therapeutics, Nanotechnology, Precision medicine, Nanomedicine, Regulatory affairs*

INADDP/PT/ON/08-P

FROM PREDICTIVE NANOCARRIER DESIGN TO PRECISION THERAPEUTICS: AN AI-INTEGRATED TRANSLATIONAL PLATFORM FOR NEXT-GENERATION DRUG DISCOVERY

Garima Singh[1], *Madhaw Kumar*[2]*
Department of Pharmaceutics Goel Institute of Pharmacy and Sciences, Faizabad Road, near Indira Canal, Anora Kala, Lucknow, Uttar Pradesh 226028 (India)
***Email**: madhaw.kumar@goel.edu.in*

Abstract:

The convergence of artificial intelligence (AI), multi-omics and nanotechnology is transforming conventional drug discovery into a predictive, adaptive and precision-oriented translational platform. This integrated approach connects

ISSN: 2584-2781

disease-specific molecular information with rational therapeutic design and intelligent drug delivery. Multi-omics technologies, including genomics, transcriptomics, proteomics and metabolomics, provide a systems-level understanding of disease heterogeneity, therapeutic targets and mechanisms of treatment response. AI and deep-learning models can integrate these complex datasets to identify actionable targets, predict drug-target interactions, optimize lead molecules and evaluate pharmacokinetic, pharmacodynamic and toxicity profiles. A major advancement within this framework is AI-driven predictive nanocarrier design. Machine-learning and generative models can optimize critical nanocarrier characteristics, including size, surface properties, composition, ligand functionalization, drug-release behaviour, biodistribution and cellular uptake. By integrating nanoparticle properties with multi-omics signatures, imaging data, and patient-specific biological responses, nanocarriers can be designed for improved targeting efficiency and reduced systemic toxicity. Furthermore, adaptive AI platforms incorporating real-time clinical feedback, pharmacokinetic data, and digital-twin modelling may enable continuous optimization of dosage and therapeutic strategies. This proposed AI integrated translational platform establishes a closed-loop pathway from predictive target discovery and molecular design to personalized nanocarrier engineering, experimental validation and precision therapeutic intervention.

Despite challenges involving data standardization, model interpretability, reproducibility, regulatory acceptance and equitable access, the integration of AI, multi-omics and intelligent nanomedicine has the potential to reduce translational failure and accelerate the development of safer, more effective next generation therapeutics.

Keywords: *Artificial intelligence; Drug discovery; Multi-omics; Nanocarriers; Precision therapeutics*.

INADDP/PT/ON/09-P

NANOTECHNOLOGY-BASED DRUG DELIVERY FOR BRAIN DISORDERS

Vandana Pal[1], *Barkha Maurya*[2], *Lovely*[3*]
S.N. College of Pharmacy, Babupur Lakhauwa Jaunpur U.P.222132
Email- *vipulpl9956@gmail.com / lovelyyadav5505@gmail.com*

Abstract:

Brain disorders such as Alzheimer's disease, Parkinson's disease, epilepsy, stroke, and brain tumors remain major therapeutic challenges due to the complex structure of the central nervous system and the presence of the blood–brain barrier (BBB). The BBB restricts the entry of many therapeutic agents into brain tissue, resulting in inadequate drug concentrations at the target site. Nanotechnology-based drug delivery systems have emerged as promising approaches to overcome these limitations. Nanocarriers such as

ISSN: 2584-2781

polymeric nanoparticles, liposomes, solid lipid nanoparticles, nanostructured lipid carriers, nanoemulsions, dendrimers, and nanogels can improve drug solubility, stability, controlled release, and targeted delivery. Surface modification of nanoparticles with suitable targeting ligands may enhance their interaction with BBB transport mechanisms and facilitate delivery to specific brain regions or cells. Nanotechnology also provides opportunities for intranasal and other non-invasive routes of brain drug delivery. Despite significant potential, challenges related to toxicity, stability, targeting efficiency, scale-up, manufacturing, and regulatory approval remain. Continued research and development of safe and effective nanocarriers may contribute to improved therapeutic outcomes in the treatment of neurological disorders.

Keywords: *Nanotechnology, Brain drug delivery, Blood–brain barrier, Nanoparticles, Targeted drug delivery, CNS disorders, Nanocarriers.*

INADDP/PT/ON/10-P

ARTIFICIAL INTELLIGENCE-ASSISTED DESIGN OF NANOMEDICINES

Diksha Singh[1], Vikas Srivastava[2]*
Goel Institute of Pharmacy & Sciences, Lucknow
Email: *dsingh888974@gmail.com*

Abstract:

Artificial Intelligence (AI) helps design of nanomedicines which is now transforming the way advanced drug delivery systems which are now being developed. By utilizing machine learning and deep learning techniques, AI can analyze large and complex datasets, predict nanoparticle behavior, optimize formulations, and identify suitable materials with great speed and accuracy. This data-driven approach reduces dependency on traditional trial-and-error methods, saves time, lowers development costs, and improves the overall efficiency of nanomedicine research. AI also helps predict important nanoparticle characteristics such as size, stability, drug loading capacity and biocompatibility which are critical for designing the effective and safe therapeutic systems. Nanomedicines offers significant advantages over traditional drug delivery methods by improving drug stability, solubility, bioavailability, and therapeutic efficacy. The merger of AI with nanotechnology enables the design of optimized nanocarriers capable of targeted drug delivery and controlled drug release. These intelligent systems can enhance treatment effectiveness while minimizing adverse side effects. Moreover, AI-driven nanomedicine design supports the development of personalized therapeutic strategies tailored to individual patient needs, contributing to the advancement of precision medicine. Despite its promising potential, several challenges remain in the widespread adoption of AI-assisted nanomedicine design. Limited access to high-quality datasets, difficulties in

ISSN: 2584-2781

interpreting AI predictions, manufacturing scalability issues, and regulatory concerns continue to hinder clinical translation. Addressing these challenges requires strong collaboration among data scientists, engineers, pharmaceutical researchers, clinicians, and regulatory agencies. Future research should focus on developing multifunctional nanocarriers, improving the transparency and reliability of AI models, and establishing cost-effective and scalable production methods. Overall, AI-assisted design of nanomedicines has the potential to revolutionize drug development and delivery by enabling safer, smarter, and more personalized healthcare solutions.

Keywords: *Artificial Intelligence (AI), Nanomedicines, Drug Delivery, Nanoparticles, Nanocarriers, Future Research.*

INADDP/PT/ON/11-P

NANOTECHNOLOGY IN TRANSDERMAL DRUG DELIVERY

Lovely Yadav[1*]
Department of Pharmaceutics, S.N. College of Pharmacy, Babupur, Lakhauwa, Jaunpur, U.P. 222132, India
***Email**: lovelyyadav5505@gmail.com*

Abstract:

Transdermal drug delivery is a desirable method for delivering therapeutic agents because it can provide controlled drug release while avoiding hepatic first-pass metabolism and gastrointestinal degradation. However, the stratum corneum, the skin's outermost layer, serves as a significant barrier to many medications' penetration. Nanotechnology is a promising strategy to overcome these restrictions and enhance transdermal medication delivery. Various nanocarriers, such as liposomes, transfersomes, ethosomes, solid lipid nanoparticles, nanostructured lipid carriers, nanoemulsions, and polymeric nanoparticles, have been studied for drug penetration and localized delivery. These nanocarriers can provide controlled release, improve drug deposition in the skin, increase drug solubility, and shield drugs from deterioration. Skin penetration may be further enhanced by surface modification combined with physical enhancement techniques. Nanotechnology-based transdermal systems may be used to administer hormones, analgesics, anti-inflammatory medications, antihypertensive medications, and other medicinal substances. Despite these benefits, issues with skin irritation, nanoparticle toxicity, formulation stability, manufacturing, scaling up, and regulatory requirements remain. Further studies could help create transdermal drug delivery systems based on nanotechnology that are safer, more effective, and more patient-friendly.

Keywords: *Nanotechnology; Transdermal drug delivery; Nanocarriers; Skin penetration; Liposomes; Solid lipid nanoparticles*

ISSN: 2584-2781

INADDP/PT/ON/12-P

DEVELOPMENT AND EVALUATION OF ALMOND OIL-LOADED NANOLIPOSOMES FOR INTRANASAL DELIVERY IN ALZHEIMER'S DISEASE

Surbhi.S. Chavhan[1]
School of Pharmacy, Parul University, India
Email: surbhichavhan@gmail.com

Abstract:

Alzheimer's disease is a brain disorder that leads to memory loss and thinking difficulties. The present medicines do not work enough and can cause harmful side effects, which has made scientists look for natural healing substances and new ways to send drugs straight to the brain. Almond oil, which is taken from *Prunus dulcis* contains unsaturated fatty acids, vitamin E, phytosterols and polyphenolic compounds that may help protect brain cells and reduce oxidative damage. This study aimed to create and evaluate Almond Oil-Loaded Nanoliposomes for use hoping that they could deliver almond oil more effectively to the brain. Almond oil was obtained by pressing and then incorporated into tiny bubble-like vesicles using the thin-film hydration technique with soy lecithin and cholesterol. Several formulations were prepared by changing the cholesterol-to-lecithin ratio. Were examined for yield, almond oil loading, loading efficiency, physical properties, shape and laboratory release. The optimized formulation showed a loading efficiency of 73.3 %. Produced vesicles smaller than 100 nanometers with a fairly uniform size distribution and a negative surface charge. Laboratory release tests demonstrated a release pattern, with 74.58 % cumulative release after 24 hours following Higuchi kinetics. The optimized formulation was further examined in a scopolamine-induced memory impairment model using tests, biochemical measurements, antioxidant assessments and histopathology. Overall the findings suggest that Almond Oil-Loaded Nanoliposomes may offer an intranasal nanocarrier approach, supporting brain protection and enhancing the therapeutic potential of almond oil, for Alzheimer's disease.

Keywords: *Almond oil; Nanoliposomes; Intranasal drug delivery; Alzheimer's disease; Neuroprotection; Scopolamine; Antioxidant activity.*

INADDP/PT/ON/13-P

ROLE OF 3D PRINTING IN CONTROLLED DRUG RELEASE FOR DIABETES: GLIPIZIDE

Anjali Rai[1]
Satyam Shivam Pharmacy College
Email- *raianjali106@gmail.com*

Abstract:

ISSN: 2584-2781

Glipizide is an oral antidiabetic drug belonging to the sulfonylurea class. It is mainly used for the treatment of Type 2 diabetes mellitus. Conventional glipizide tablets may require repeated dosing, while 3D printing offers a potential method for designing tablets with customized drug-release properties. A literature-based review was carried out on the use of 3D printing for controlled drug delivery of glipizide. Scientific literature related to 3D-printed tablets, glipizide formulations, controlled release, personalized dosing, and pharmaceutical 3D-printing techniques was reviewed. Important formulation factors such as tablet design, polymer concentration, infill density, porosity, and drug-release pattern were considered.3D printing can be used to prepare glipizide tablets with specific shape, internal structure, porosity. These factors can be adjusted to control how quickly the drug is released after administration. A 3D-printed glipizide formulation can be designed to provide slow and controlled release of the drug. By changing the printing pattern, infill density, polymer concentration. This may help maintain more consistent drug levels and reduce the need for frequent dosing. Customized drug dose, Possibility of reducing dosing frequency, Improved patient convenience, Potential for combining drugs in one dosage form, Flexible tablet design. Further research is required to establish the stability, manufacturing reproducibility, safety, release performance, and regulatory requirements of 3D-printed glipizide formulations.

Keywords: *3D printing; Glipizide; Type 2 diabetes; controlled drug release; personalized medicine; 3D-printed tablets; drug delivery; pharmaceutical technology.*

INADDP/PT/ON/14-P

REGULATORY ROADBLOCKS IN TARGETED NANOMEDICINE TRANSLATION

Snigdha Mishra[1], Hiralben Mehta[2*]

1.Department of Regulatory Affairs, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, P.O- Limda, Waghodia-391760, Gujarat, India.

2.Department of Quality Assurance, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, P.O- Limda, Waghodia-391760, Gujarat, India.

Abstract:

The translation of targeted nanomedicines from preclinical development to commercialization faces significant regulatory challenges globally. While advanced drug delivery platforms offer unprecedented precision, existing regulatory frameworks often lack specific guidelines for characterizing complex nanoscale formulations. This study reviews the primary regulatory roadblocks in the approval pathways of active-targeted nanocarriers. Key challenges include the lack of standardized protocols for evaluating in vivo biodistribution, complex chemistry,

ISSN: 2584-2781

manufacturing and control requirements, and the difficulty in scaling up production while maintaining batch-to-batch consistency. Furthermore, assessing the immunogenicity and long-term toxicity of novel surface ligands remains a critical hurdle for regulatory bodies. We propose the integration of adaptive regulatory pathways and early engagement strategies with agencies to streamline the approval process. Standardizing analytical techniques for nanoparticle characterization and harmonizing global regulatory guidelines are essential to bridge the translational gap. Overcoming these regulatory bottlenecks will ultimately accelerate the clinical availability of next-generation therapeutics for patients.

Keywords: *Nanomedicine Regulation, Targeted Delivery, Clinical Translation, CMC Requirements, Regulatory Harmonization.*

INADDP/PT/ON/15-P

QUALITY BY DESIGN APPROACHES IN NANOTHERAPEUTIC MANUFACTURING

Ujjwal Godse[1], Sweta Patel[2], Janki Thakkar[3]

Parul Institute of Pharmacy and Research, Parul University, P.O- Limda, Waghodia-391760, Gujarat, India

Email ID: godseujjwal@gmail.com

Abstract:

Ensuring consistent product quality is a major hurdle in the commercialization of complex nanomedicines. Quality by Design is a systematic science-based approach that integrates regulatory compliance directly into the development and manufacturing lifecycle of nanotherapeutics. This study investigates the application of Quality by Design principles in the formulation of lipid and polymeric nanoparticles to meet stringent regulatory expectations. By defining the target product quality profile, critical quality attributes such as particle size, encapsulation efficiency, and zeta potential were identified. Design of experiments was utilized to establish the design space and evaluate the impact of critical material attributes and critical process parameters on the final nanoparticle formulation. Implementation of process analytical technology enabled real-time monitoring ensuring robust batch-to-batch reproducibility and minimizing manufacturing risks. The integration of Quality by Design not only optimizes the therapeutic efficacy and stability of nanocarriers but also significantly accelerates the regulatory review process by demonstrating a comprehensive understanding of the manufacturing process. Adopting these proactive regulatory strategies is crucial for the successful clinical translation of advanced drug delivery platforms.

Keywords: *Quality by Design, Nanomanufacturing, Critical Quality*

ISSN: 2584-2781

Attributes, Regulatory Compliance, Process Optimization

INADDP/PT/ON/16-P

NANOPARTICLES IN TARGETED DRUG DELIVERY: A NOVEL APPROACH

*Pratima Prajapati[1]**
Department of Pharmacy, S.N. College of Pharmacy, Babupur Lakhauwa, Jaunpur, U.P. 222132, India
Email Id: Pratimaprajapati20920@gmail.com

Abstract:

In contemporary pharmaceutical sciences, nanotechnology has become a significant strategy, especially in the area of targeted drug delivery. Nanoparticles are drug carriers at the nanoscale that can be engineered to deliver therapeutic agents to particular cells or tissues. The goal of targeted drug delivery is to increase a medication's therapeutic effect while minimizing needless exposure to healthy tissues. For a variety of drug delivery applications, nanoparticles like liposomes, polymeric nanoparticles, solid lipid nanoparticles, nanostructured lipid carriers, and metallic nanoparticles have been studied. Drugs can be delivered in a controlled and targeted manner thanks to their small size, large surface area, and adjustable surface characteristics. Depending on the drug, nanoparticle system, and biological target, targeting can be accomplished either passively or actively. Potential uses for nanoparticle-based delivery include antimicrobial therapy, cancer treatment, brain drug delivery, gene delivery, and vaccine delivery. Notwithstanding these benefits, issues like toxicity, stability, cost, manufacturing complexity, and regulatory requirements continue to be significant factors. The safety, effectiveness, and accuracy of targeted drug delivery systems based on nanoparticles may be enhanced by ongoing research and technological advancement. Nanoparticles are therefore a promising strategy for the creation of sophisticated drug delivery systems.

Keywords- *Nanoparticles; Targeted drug delivery; Nanotechnology; Drug carriers; Controlled release; Nanomedicine.*

INADDP/PT/ON/17-P

AI-DRIVEN 3D BRAIN-ON-A-CHIP PLATFORM FOR HIGH-THROUGHPUT SCREENING OF TARGETED NANOTHERAPEUTICS IN MULTIPLE SCLEROSIS

Sneha Chauhan[1], Saloni Jaiswal[2]*
Faculty of Medical, Para-medical and Allied Health Sciences, Department of Pharmacy, Jagannath University, Jaipur, 303901, Rajasthan, India.
Email- snehachauhan9171@gmail.com / saloni.jaiswal@jagannathuniversity.org

Abstract:

Treating Multiple Sclerosis is still a massive challenge in modern medicine, mainly because the disease destroys both the protective myelin sheath and the

ISSN: 2584-2781

blood-brain barrier. Traditional 2D cell cultures are too simple to mimic complex human brain tissue, while animal testing often yields results that simply do not translate to human clinical trials. Because of these big testing gaps, many promising drug candidates end up failing late in development after huge investments. To fix this screening problem, our team built a microfluidic 3D Brain-on-a-Chip platform integrated with automated computer vision to evaluate targeted nanomedicines. We engineered a micro-chip containing primary human endothelial cells, astrocytes, and oligodendrocytes, creating a physical model that behaves like a human neurovascular unit under disease conditions. Custom image analysis algorithms continuously tracked how nanoparticles traveled across the chip, measuring barrier tightness, cell uptake, and structural myelin repair in real time. Our findings confirmed that fluid movement inside the micro channels gave much more realistic predictions of drug transport than flat plastic petri dishes ever could. The surface-engineered nanocarriers navigated across the artificial biological barrier without any issues, dropping their drug payloads directly onto damaged axon sites without damaging surrounding cells. Overall, this organ-chip technology offers a realistic bridge between initial benchwork and human biological testing. By giving researchers, a practical, high-throughput way to screen new central nervous system drugs quickly, this platform substantially reduces our dependence on live animal testing while speeding up the search for effective therapies.

Keywords: *Multiple Sclerosis, Brain-on-a-Chip, Artificial Intelligence, Nanotherapeutics, High-Throughput Screening, BBB.*

INADDP/PT/ON/18-P

ANALYTICAL APPROACHES FOR DRUG–EXCIPIENT COMPATIBILITY AND THEIR ROLE IN FORMULATION DEVELOPMENT

Utkrisht Mahajan[1], Krishna Arjun Bhatia[2], Shivang Shukla[3]*
University Institute of Pharma Sciences and Research, Chandigarh University, Gharuan, Mohali, 140413, India

Abstract:

Drug–excipient compatibility is an important step in formulation development because interactions between a drug and an excipient can affect the stability and quality of the final product. Traditionally, compatibility is studied using experimental techniques such as FTIR, DSC, TGA and XRD. This review explores these approaches along with the growing use of computational methods for predicting compatibility at an early stage. A key focus is the development of a Drug–Excipient Compatibility Engine (DECE), which uses the molecular structures of drugs and excipients as input. The proposed approach combines a graph neural

ISSN: 2584-2781

network based on AttentiveFP with an inter-molecular cross-attention layer to study interactions between the two molecules. Along with the neural network features, a set of SMARTS-based chemical rules is used to identify important structural risks such as acid–base interactions, nucleophile–electrophile reactions, inorganic components and polymer-related impurities. The neural and rule-based information is then combined and analysed using an XGBoost classifier. SHAP is used to explain the factors contributing to each prediction, making the results easier to understand. The review highlights how combining conventional analytical methods with AI-based prediction can help identify potentially incompatible drug–excipient combinations earlier and support better excipient selection during formulation development.

Keywords: *Drug–excipient compatibility, AttentiveFP, Artificial intelligence, Cross-attention, XGBoost, Explainable AI*

INADDP/PT/ON/19-P

ONE POT SYNTHESIS OF BIOACTIVE PYRAZOLE DERIVATIVES USING NATURAL ORGANIC ACID CATALYSTS AND EVALUATION OF THEIR ANTI-INFLAMMATORY POTENTIAL

Bhumi Agarwal [1], Prof . (Dr) Nanda Kishor Agarwal * Bal Krishna Singh [3]

[1] *Department of Pharmaceutical Chemistry, Aryakul College of Pharmacy and research, Lucknow , Uttar Pradesh , India*

[2]*Department of Pharmaceutical Chemistry, Aryakul College of Pharmacy and research, Lucknow, Uttar Pradesh, India*

[3]*Department of Pharmaceutical Chemistry, Aryakul College of Pharmacy and research, Lucknow, Uttar Pradesh, India*

Email Id: *Bhumiagarwal4916@gmail.com*

Abstract:

Pyrazole derivate represents an important class of nitrogen -containing heterocyclic and have attracted considered attention due to their diverse biological activities. The present study focuses on the development of an efficient one pot synthesis approach for the preparation of Bioactive Pyrazole Derivatives Using a natural organic acid as a catalyst. One pot synthesis in an attractive strategy in organic chemistry because multiple transformations can be carried out in a single reaction vessel, thereby simplifying the synthesis procedure and potentially reduced reaction time, solvents consumption, and waste generation. In the proposal study, suitable starting material will be subjected to a one pot reaction in the presence of a natural organic acid's catalyst under optimized reaction condition to obtain the desired pyrazole derivatives. The synthesized compounds

ISSN: 2584-2781

will be purified and characterized using suitable analytical and spectroscopic techniques the confirm to structure. Furthermore, the synthesized pyrazole derivatives will be evaluated for their potential anti- inflammation activities using an appropriate biological evaluation method. The study aims to develop an efficient and comparatively environmentally friendly approach for the synthesis of biologically relevant pyrazole derivatives. The synthesized compounds may provide useful leads for further investigation of pyrazole-based molecule with potential anti-inflammation properties and demonstrate the applicability of greener synthetic methodologies in medicinal chemistry.

Keywords: *One pot synthesis;Pyrazole derivatives; Natural Organic Acid Catalysts; Green Chemistry; Heterocyclic Compounds; Anti-inflammatory activity*

INADDP/PT/ON/20-P

SYSTEMATIC REVIEW ON MANGIFERIN FORMULATION DEVELOPMENT FOR DIABETES MANAGEMENT

Sanket Gabhale,, Karuna Nagula*
Amity Institute of Pharmacy, Amity University, Maharashtra,
Mumbai Pune Expressway, Bhatan, Somathne, Panvel, Mumbai 410206
***Email ID**: knnagula@mum.amity.edu*

Abstract:

Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder requiring effective and patient-compliant therapeutic approaches. Mangiferin, a natural polyphenolic xanthone derived from Mangifera indica, exhibits promising antidiabetic and pancreatic β-cell-protective activities; however, its poor aqueous solubility and limited oral bioavailability may limit its therapeutic effectiveness. The present research proposes the formulation and development of mangiferin-loaded liquisolid granules to enhance drug solubilization, dissolution, and oral delivery to effectively manage T2DM. The study will involve selection and authentication of herbal material, extraction and phytochemical evaluation of mangiferin, followed by comprehensive preformulation studies including solubility, drug–excipient compatibility, and analytical method development. Liquisolid granules will be prepared using suitable non-volatile solvents, carrier materials, coating materials, and granulation techniques. A Quality-by-Design (QbD) approach will be employed to identify critical formulation variables and optimize the formulation using appropriate experimental designs. The optimized formulation will be evaluated for flow properties, drug content, particle characteristics, dissolution behavior, and physicochemical properties using FTIR, DSC, PXRD, and SEM. Comparative in vitro and in vivo antidiabetic evaluation

ISSN: 2584-2781

will be performed to assess therapeutic potential. Stability studies will further establish formulation robustness. The proposed system is expected to provide stable, free-flowing liquisolid granules with improved dissolution and bioavailability potential, thereby supporting the development of an effective herbal-based oral delivery system for T2DM management.

Keywords: *Diabetes mellitus, mangiferin, liquisolid compact, Quality by Design.*

INADDP/PT/ON/21-P

NANOTECHNOLOGY-DRIVEN APPROACHES TO BIOACTIVE COMPOUND DELIVERY: MECHANISMS, PLATFORMS, AND TRANSLATIONAL POTENTIAL

Shipra Yadav[1], Sunita Thakur*[2]
**Assistant Professor, Department of Pharmaceutics*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow 226028 (India)
Email Id: *sthakur@lko.amity.edu, shipra.yadav3@s.amity.edu*

Abstract:

Food and natural-source bioactive compounds offer substantial therapeutic potential, yet their clinical utility is frequently restricted by poor solubility, chemical instability, gastrointestinal degradation, rapid metabolism, and low systemic bioavailability. Nanotechnology provides an integrated strategy to overcome these barriers by tailoring the physicochemical properties, gastrointestinal fate, cellular uptake, and release profiles of bioactive compounds. This review critically evaluates recent advances in nanotechnology-enabled delivery, encompassing lipidic, polymeric, self-assembled, and hybrid nanocarriers, with emphasis on their mechanisms of bioactive protection, absorption enhancement, controlled release, and tissue-specific delivery. The influence of key formulation attributes, including particle size, surface characteristics, morphology, encapsulation efficiency, and release kinetics, on therapeutic performance is also highlighted. Beyond conventional nanocarriers, emerging biodegradable, biomimetic, stimuli-responsive, and artificial intelligence-assisted systems are discussed as potential avenues for precision delivery and formulation optimization. Despite encouraging preclinical outcomes, clinical translation remains limited by nanotoxicity, formulation stability, manufacturing scalability, reproducibility, cost, and regulatory complexity. Addressing these challenges through standardized characterization, predictive safety assessment, scalable manufacturing, and rational formulation design will be essential for translating nanotechnology-enabled bioactive delivery from experimental platforms into clinically and commercially viable therapeutics.

Keywords: *Bioactive compounds,*

ISSN: 2584-2781

Nanotechnology, Nanocarriers, Bioavailability, Targeted delivery, Controlled release

INADDP/PT/ON/22-P

INTERPENETRATING POLYMERIC NETWORK BEADS: AN EMERGING PLATFORM FOR NEXT-GENERATION TARGETED DRUG DELIVERY

Divya Thakur1, Neha Raghuwanshi2*
1Department of Pharmaceutics, Amity Institute of Pharmacy, Maharashtra, Mumbai
2Department of Pharmaceutics, Amity Institute of Pharmacy, Maharashtra, Mumbai
Email-divya.thakur.ent15@gmail.com

Abstract:

Advanced drug delivery systems that can enhance drug stability, bioavailability, therapeutic efficacy, and site-specific release are necessary for the development of next-generation therapies. For regulated, targeted, and stimuli-responsive drug delivery, interpenetrating polymeric network (IPN) beads have become a flexible platform. The potential of IPN bead technology as an advanced approach for creating multipurpose medicinal delivery systems is examined in this paper. IPNs, which offer improved mechanical integrity, stability, swelling properties, and adjustable drug-release behavior, are made up of two or more interlaced polymeric networks. Incorporating natural and synthetic polymers such as alginate, chitosan, xanthan gum, and isabgol husk, as well as their cross-linking methods and impact on formulation performance, the review focuses on rational polymer selection. Emerging technologies including microfluidics, spray drying, and three-dimensional printing are covered alongside traditional fabrication techniques like ionotropic gelation and emulsion cross-linking. In order to provide controlled and site-specific therapeutic delivery, special attention is given to gastroretentive, colon-targeted, pH-sensitive, and other stimuli-responsive systems. The use of IPN beads for herbal and nutraceutical substances is also discussed, notably to improve stability and bioavailability. Furthermore, combining IPN-based systems with nanotechnology, sophisticated manufacturing, and AI-assisted formulation optimization is a promising step toward personalized and patient-centric medicines. Despite the significant potential, problems like as scalability, reproducibility, regulatory approval, and clinical translation persist. Future research that combines durable polymers, nano-enabled techniques, and computational methodologies may aid in the creation of novel IPN-based delivery systems for next-generation therapies.

Keywords: *Interpenetrating polymeric networks, Advanced drug delivery system, Stimuli-responsive systems, Controlled release, Personalized therapeutics*.

ISSN: 2584-2781

INADDP/PT/ON/23-P

PREPARATION AND EVALUATION OF CPX-CS-NANOPARTICLES LOADED MICRONEEDLES FOR IMPROVED SKIN PENETRATION AND ANTIMYCOTIC EFFECT

*Swarthi Kumari Dohare1**

*1*Assistant Professor, B. R. Nahata College of Pharmacy, Mandsaur University, Mandsaur, Madhya Pradesh, India, Pin 458001*

Email:
swatichoudhary626380@gmail.com ,

Abstract

Background: Cutaneous mycoses are prevalent superficial fungal infections, but their topical management is often limited by the poor penetration of antifungal drugs across the stratum corneum. CPX, a broad-spectrum antifungal agent, is conventionally administered through creams, solutions, shampoos, and nail lacquers; however, limited dermal penetration may restrict localized drug availability. Objective: This study aimed to develop CPX-loaded chitosan nanoparticles (CPX-CSNPs) incorporated into dissolving microneedle (MN) arrays to enhance localized antifungal drug delivery. Methods: CPX-CSNPs were prepared by ionic gelation using sodium tripolyphosphate as a cross-linking agent and characterized for particle size, polydispersity index (PDI), zeta potential, entrapment efficiency, and in vitro drug release. Optimized nanoparticles were incorporated into dissolving MN arrays fabricated using a micromolding technique. The developed arrays were evaluated for morphology, structural integrity, mechanical properties, swelling behavior, moisture uptake, folding endurance, drug loading, insertion capability, and drug release. Antimycotic activity was additionally investigated against selected fungal strains. Results: Optimized CPX-CSNPs exhibited a particle size of 148.67 ± 2.21 nm, PDI of 0.275 ± 0.095, and zeta potential of +17.73 ± 7.055 mV and 82% entrapment efficiency. Approximately 90.42 ± 6.30% drug release was achieved after 48 h. CPX-CSNP-loaded MNs demonstrated well-defined morphology, adequate mechanical integrity, 83.96 ± 6.40% swelling, 28.58 ± 2.46% moisture uptake, and 79.33 ± 2.59 cycles folding endurance and effective insertion capability for enhanced skin penetration. Conclusion: CPX-CS-NPs-loaded dissolving MNs represent a promising minimally invasive platform for localized and controlled antifungal delivery. However, in-vitro cell-line studies to further evaluate the antimycotic efficacy and cellular response of the developed system have not yet been performed, representing an important limitation and an area for future investigation.

Keywords: *Antifungal therapy; CPX; Chitosan nanoparticles; Dissolving microneedles; Cutaneous mycoses; Skin penetration; Topical drug delivery*;

ISSN: 2584-2781

INADDP/PT/ON/24-P

STIMULUS-ACTIVATED AND FEEDBACK-REGULATED RATE-CONTROLLED DRUG DELIVERY SYSTEMS

Prince Tiwari1, Nimisha2*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus – 226028 Email Id: nsrivastava3@lko.amity.edu

ABSTRACT

Modern technologies for controlling drug release include stimulus-activated and feedback-regulated delivery systems. This means the drug release takes place depending on the body's needs. Conventional delivery systems usually release the drug in a fixed regime which may not guarantee the release of the drug in the required concentration. The new approach is capable of solving the problem since it is sensitive to the changes in factors including pH, temperature, glucose or enzyme presence, light or electromagnetic field as well as many others. The feedback-regulated systems have an advantage since they can modify drug release according to the change in a physiological state. The application of the systems makes it possible to achieve a stable drug level for a longer time and consequently reduce the number of administration and side effects. During our work we will describe the principles of operation of the new systems including their types, features, mechanisms of operation as well as advantages and disadvantages of such approach to drug delivery.

KEYWORDS- *Stimulus-activated drug delivery, feedback-regulated frug delivery, rate-controlled drug release, stimulus-responsive system, smart drug delivery, controlled release.*

INADDP/PT/ON/25-P

NEXT-GENERATION NANOCARRIERS: ADVANCED STRATEGIES FOR ENHANCING OCULAR RETENTION AND CORNEAL PERMEATION

Jayprakash Singh1, Sunita Thakur2*,
**Assistant Professor, Department of Pharmaceutics*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow 226028 (India)
Email Id: *sthakur@lko.amity.edu jayprakash.singh@s.amity.edu*

Abstract:

Delivering therapeutics effectively to the eye continues to be one of the toughest hurdles in pharmaceutical design. While traditional options like standard eye drops remain popular due to how easy they are to use, their real-world impact is severely restricted by the eye's natural defense mechanisms. Constant blinking, reflex tearing, fast tear turnover, and rapid drainage through the nasolacrimal

ISSN: 2584-2781

canal quickly washes away active compounds before they can do their job. As a result, only a tiny fraction of the applied dose actually reaches target tissues, forcing patients into demanding, high-frequency dosing schedules that often leads to poor compliance. Beyond rapid surface clearance, conventional formulations struggle to cross the tough corneal epithelium or reach deeper posterior structures, making them ill-equipped to treat chronic, vision-threatening conditions. To overcome these roadblocks, researchers are increasingly turning to nanocarrier-based drug delivery systems. Platforms such as liposomes, noisome, polymeric nanoparticles, solid lipid nanoparticles, nanostructured lipid carriers, dendrimers, and nano emulsions offer unique ways to solubilize delicate or poorly soluble drugs, shield them from degradation, and control their release over time. By tailoring their surface characteristics and chemical properties, these nanoscale systems can interact more effectively with biological barriers, drastically improving corneal penetration and local retention while minimizing systemic absorption. This review explores the main limitations of traditional therapies, outlines the mechanisms driving nanocarrier success, and highlights how rational design choices can transform modern ophthalmic care.

Keywords: *Ocular drug delivery; ophthalmic formulations; corneal barrier; precorneal clearance; sustained drug delivery ; nanocarriers.*

INADDP/PT/ON/26-P

A REVIEW ON OCULAR DRUG DELIVERY SYSTEMS CHALLENGES ADVANCES AND NOVEL APPROACH

Mohd Sameer khan1, Shasank Soni2*,
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus – 226028
***Email Id**: ssoni@lko.amity.edu*

ABSTRACT

Ocular drug delivery is challenging because of rapid tear turnover, blinking, nasolacrimal drainage and anatomical and physiological barriers of the eye. Conventional ophthalmic formulations often have short residence time and limited ocular bioavailability, requiring frequent administration. Novel drug delivery systems have therefore been developed to overcome these limitations. Nanoparticles, liposomes, Nano emulsions, microspheres, ocular inserts and in-situ gels can provide prolonged ocular residence, controlled drug release and improved therapeutic performance. This review will summarize the current status, advantages, limitations and future prospects of these systems, with emphasis on approaches that can improve ocular drug delivery and patient compliance.

Keywords: *Ocular drug delivery; ophthalmic drug delivery systems; Ocular barriers; corneal permeation.*

ISSN: 2584-2781

INADDP/PT/ON/27-P

NANO-ENABLED ARTIFICIAL INTELLIGENCE: A CONVERGENT APPROACH TO EARLY DIAGNOSIS AND PRECISION THERAPY IN PEDIATRIC CONGENITAL HEART DISEASE

Shivam Shukla, Dr. Poonam Parashar*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow -226028, INDIA
Corresponding Author – pparashar@lko.amity.edu
Presenting Author - shivam51@s.amity.edu

Abstract

Artificial intelligence and nanotechnology are converging to reshape critical, interpretation-heavy processes in pediatric cardiology, including diagnosis, risk stratification, and postoperative management. This scoping review searched the Scopus, Embase, and PubMed databases for literature published between 2002 and 2024 on the application of AI-driven and nanotechnology-based tools in congenital heart disease (CHD). Findings indicate that machine learning and deep neural networks have substantially improved the diagnostic yield of cardiac magnetic resonance imaging, echocardiography, computed tomography, and electrocardiography, while nanoparticle-based contrast agents, including iron oxide and gold nanoparticles, have further enhanced image resolution and segmentation accuracy in these same modalities. Nano biosensors incorporating gold nanoparticles, quantum dots, and graphene-based platforms enable ultrasensitive detection of cardiac biomarkers such as troponin and BNP from minimal blood volumes, an advantage particularly relevant to neonatal screening. AI-based prediction algorithms have improved postoperative outcomes and prognosis in pediatric cardiac surgery patients, and this benefit may be extended through nanocarrier-based drug delivery systems, such as liposomes and dendrimers, which allow targeted, AI-optimized dosing of cardiac drugs while reducing systemic toxicity in children. Despite this progress, clinical translation remains constrained by the early-stage nature of integrated AI-nanotechnology algorithms, limited physician training, high development costs, and concerns over the loss of clinical judgment ("human touch"). Continued advancement in machine learning, neural networks, and nanomedicine is expected to support earlier CHD diagnosis, more precise imaging, and individualized therapeutic strategies, positioning precision cardiology as a central direction for future pediatric cardiac care.

Keywords: *pediatric cardiology, congenital heart disease, artificial intelligence, nanotechnology, nano biosensors*

ISSN: 2584-2781

INADDP/PT/ON/28-P

SMART DRUG DELIVERY PLATFORMS FOR PERIODONTAL REGENERATION: CURRENT STATUS AND EMERGING PERSPECTIVES

Aman Yadav, Shashank Soni*
Amity Institute of Pharmacy, Amity University Uttar Pradesh Lucknow Campus, Lucknow-226028, India
Corresponding Author – ssoni@lko.amity.edu
Presenting Author – aman.yadav51@s.amity.edu

Abstract:

Periodontal disease is one of the most common oral diseases characterized by an irreversible loss of periodontal tissues responsible for anchorage and stabilization of the tooth within the jaw, including gingiva, periodontal ligament, cementum, and alveolar bone. Although such treatment options as scaling and root planing or periodontal surgeries could prevent infections, these treatment methods fail to regenerate damaged periodontal tissues, thus necessitating development of advanced drug delivery systems aimed at active regeneration of these tissues. In recent years, the tendency has been observed from the design of traditional drug delivery systems that merely deliver drugs to their target locations to more intelligent drug delivery systems, which rely on the biological environment of a target site. The examples of such intelligent drug delivery systems include stimuli-responsive nanoparticles, injectable hydrogels, 3D printed scaffolds, and microspheres loaded with growth factors. These drug delivery systems react on changes in the parameters of the biological environment, such as local pH, enzyme activity, or presence of bacteria and release therapeutic agents only when it is necessary. However, there are numerous challenges that should be solved before these systems can be widely implementedas clinical tools – such as scalability issues, biocompatibility, high costs of manufacture, and more. The present review aims at compiling the most up-to-date information on the use of smart drug delivery systems for the purpose of periodontal regeneration, presenting the current state-of-theart, as well as innovations that can make a breakthrough in the sphere.

Keywords: Periodontal regeneration, smart drug delivery systems, stimuli-responsive systems, hydrogels, nanoparticles, tissue engineering, growth factors

INADDP/PT/ON/29-P

SYNTHESIS AND EVALUATION OF DISSOLVING MICRONEEDLE PATCHES FOR VACCINE DELIVERY

Nainika Tiwari, Dr. Satya Prakash Singh

ISSN: 2584-2781

Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow 226028 (India)
Email - nainika.tiwari@s.amity.edu spsingh@lko.amity.edu

Abstract

Dissolving microneedle (MN) patches have become a cutting-edge, less invasive vaccination delivery method. These devices are made to pierce the skin's outermost layer, disintegratonce inserteded, and release encapsulated vaccination antigens straight into the dermal and epidermal areas that are rich in antigen-presenting cells. Dissolving microneedles have a number of benefits over traditional hypodermic injections, such as painless administration, increased patient compliance, less risk of needlestick accidents, removal of biohazardous sharps waste, and the potential for self-administration. The creation of dissolving microneedles employing biodegradable polymers such hyaluronic acid, polyvinyl alcohol, chitosan, and polysaccharides has advanced significantly in recent years. A variety of microfabrication techniques, including as photolithography, 3D printing, and micromolding, have made it possible to produce biocompatible, mechanically robust microneedles with regulated drug loading capacity. Characterisation of morphology, mechanical strength, insertion efficiency, dissolution behaviour, drug release profile, stability, and immunological reaction are all part of the assessment of dissolving microneedle patches. Research has shown that vaccine-loaded dissolving microneedles can improve vaccine stability during storage while producing potent humoral and cellular immune responses. Hyaluronic acid-based influenza vaccine microneedle patches have demonstrated encouraging clinical safety and effectiveness in human trials. Notwithstanding these developments, issues like long-term stability, dose homogeneity, largescale production, and regulatory approval still require attention. However, dissolving microneedle technology offers a very promising platform for vaccination programs in the future, especially in countries with limited resources and mass immunisation.

***Keywords**: Dissolving microneedles, Vaccine delivery, Transdermal drug delivery, Microneedle patch, Immunization, Hyaluronic acid, Biodegradable polymers Controlled drug release, Microneedle Patch, Drug delivery system*

INADDP/PT/ON/30-P

RECENT ADVANCES IN NOVEL DRUG DELIVERY SYSTEM

Ankit Chauhan1, Satya Prakash Singh*1

1Amity Institute of Pharmacy, Amity University Uttar Pradesh Lucknow Campus, India.226028
Email ID: ankit.chauhan12@amitylucknow.edu.in

ISSN: 2584-2781

Abstract:

Novel Drug Delivery Systems (NDDS) represent an important advancement in pharmaceutical science, developed to address several limitations associated with conventional drug delivery approaches. Conventional dosage forms may be affected by problems such as poor bioavailability, rapid elimination of drugs, frequent dosing requirements and unwanted adverse effects. NDDS are designed to overcome these challenges by providing controlled, sustained, targeted and site-specific delivery of therapeutic agents, which can ultimately improve treatment outcomes and patient compliance. It provide a comprehensive overview of Novel Drug Delivery Systems, with particular emphasis on their principles, types, mechanisms of drug release, pharmaceutical applications, advantages, limitations and future prospects. Various advanced delivery platforms, including nanoparticles, liposomes, polymeric micelles, dendrimers, microspheres, hydrogels, transdermal systems and implantable systems, will be discussed. These systems offer potential benefits such as improved drug solubility and stability, enhanced bioavailability, protection of therapeutic agents and reduction in dosing frequency. Targeted and stimuli-responsive delivery systems can further improve therapeutic precision by enabling drug release at specific sites or in response to physiological conditions such as pH, temperature and enzymes. The study will be based on a systematic review of relevant peer-reviewed research articles, review papers, books and patents retrieved from scientific databases. In this we will also consider current challenges, including toxicity, stability, aggregation, manufacturing scale-up, cost and regulatory requirements. Future developments are expected to focus on biodegradable materials, personalized drug delivery, smart delivery systems, advanced targeting strategies and artificial intelligence-assisted formulation development. Overall, NDDS offer considerable potential for improving the safety, efficacy and precision of modern drug therapy.

Keywords: *Novel Drug Delivery Systems (NDDS), Controlled Release, Targeted Drug Delivery, Nanoparticles, Liposomes, Polymeric Micelles, Dendrimers, Hydrogels, Nanocarriers*.

INADDP/PT/ON/31-P

ADVANCEMENT IN OCULAR DRUG DELIVERY SYSTEM

Pramod Kumar Yadav1, Vishakha Jaiswal*1
1Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow, India 226028 Email ID: pramod.yadav1@s.amity.edu

Abstract:

Advances in ocular drug delivery have focused on overcoming the anatomical, physiological, and patient-related

ISSN: 2584-2781

limitations associated with conventional eye drops, including rapid precorneal clearance, poor drug permeation, limited bioavailability, and inadequate patient compliance. This review aims to summarize recent and emerging strategies designed to improve ocular drug retention, penetration, controlled release, and therapeutic efficacy. The assessment examines different administration routes and advanced delivery platforms, including liposomes, niosomes, polymeric nanoparticles, solid lipid nanoparticles, nanostructured lipid carriers, dendrimers, nanomicelles, nanosuspensions, and nanoemulsions. Generally in situ gelling and mucoadhesive systems, drug-eluting contact lenses, punctal plugs, ocular inserts, and biodegradable and non-biodegradable implants. Emerging technologies such as microneedles, iontophoresis, 3D-printed ocular devices, hydrogel reservoirs, and stimuli-responsive systems offer additional opportunities for site-specific and sustained drug delivery. Furthermore, advances in biologics, anti-VEGF therapies, AAV-based gene delivery, RNA therapeutics, and regenerative approaches are expanding the therapeutic potential of ocular drug delivery. Natural polymers and green-synthesized nanomaterials are also gaining attention because of their potential biocompatibility and safety advantages. Overall, these developments demonstrate a transition from conventional formulations toward sophisticated, sustained, targeted, and patient-oriented delivery systems. Continued optimization of safety, efficacy, manufacturing, regulatory acceptance, and clinical translation will be essential for converting these promising technologies into reliable therapeutic solutions.

Keywords: *Ocular Drug Delivery; Nanotechnology; Controlled Release; Mucoadhesive Systems; Gene Therapy; Targeted Delivery*

INADDP/PT/ON/32-P

NANOSUSPENSION-LOADED HYDROGELS FOR CONTROLLED AND TARGETED DRUG DELIVERY: FORMULATION STRATEGIES AND CHARACTERIZATION

Nishant Sharma, Shashank Soni*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow -226028, INDIA
Corresponding Author - ssoni@lko.amity.edu
Presenting Author – nishant.sharma12@s.amity.edu

Abstract:

Nanosuspension-based pharmaceutical delivery systems have been proposed as promising approaches to improve solubility, dissolution rate, bioavailability, and therapeutic performance of poorly water-soluble drugs. However, conventional nanosuspensions may suffer from physical instability, particle aggregation

ISSN: 2584-2781

and difficulty in maintaining prolonged drug release at the site of interest. Embedding nanosuspensions in hydrogel matrices provides a versatile approach to overcoming these limitations, combining the nano-scale properties of drug particles with the structural and sustained release properties of hydrogels. Nanosuspension loaded hydrogels can ensure improved drug retention, controlled release, improved local drug concentration and reduce dosing frequency thus improving therapeutic efficacy and patient compliance. This review covers the basic principles involved in the formulation of nanosuspension loaded hydrogels, including the choice of polymers, stabilizers, methods of preparation, particle size reduction and techniques for hydrogel incorporation. The key formulation and evaluation parameters such as particle size, polydispersity index, zeta potential, gel properties, drug loading, encapsulation efficiency, rheological behavior and in vitro drug-release performance are also highlighted. In addition, the recent advances in the application of nanosuspension-hydrogel system in topical, transdermal, ocular, oral and other targeted drug delivery methods are elaborated. The review highlights the potential of these hybrid systems as versatile platforms for controlled, site-specific and therapeutically effective drug delivery.

Keywords- *Nanosuspension, Hydrogel, Nanoparticulate drug delivery, Poorly water-soluble drugs; Solubility enhancement Drug delivery systems, Sustained release, Therapeutic applications.*

INADDP/PT/ON/33-P

PHARMACEUTICAL COCRYSTALS: A NOVEL CRYSTAL ENGINEERING APPROACH FOR ENHANCING DRUG SOLUBILITY AND BIOAVAILABILITY

Sabrina alam, Narahari Narayan Palei

Amity Institute of Pharmacy (AIP) . Amity University Lucknow Campus Lucknow (226028) India
Email : sabrina.alam@s.amity.edu , nnpalei@lko.amity.edu

Abstract:

Inadequate water solubility accounts for one of the challenges impeding dissolution, absorption, and oral bioavailability of several drugs, particularly poorly solubilizing drug candidates. However, the field of pharmaceutical cocrystallization has developed as one effective crystal engineering technique towards overcoming the above problems without changing the covalent construction of the original active pharmaceutical ingredient (API). Pharmaceutical cocrystals consist of an API and a coformer acceptable according to pharmaceutical norms that are bound together in a proper ratio by means of non-covalent interactions,

ISSN: 2584-2781

including hydrogen bonds, ionic interactions, and π-π interactions. With the help of the right choice of coformers and supramolecular synthons, it becomes possible to change the process of packing and interaction of drug crystals with each other. That provides various physicochemical features of the drug such as aqueous solubility, solubility, stability, hygroscopicity, and mechanical characteristics that influence drug bioavailability. The use of various methods is necessary for the formation of cocrystals, such as solvent evaporation, cooling crystallization, slurry conversion, liquid-assisted grinding, neat grinding, and spray drying. Cocrystals must be characterized through techniques like powder X-ray diffraction (PXRD), differential scanning calorimetry (DSC), Fourier-transform infrared spectroscopy (FTIR), etc. The application of the appropriate methods for the development of cocrystals has been proven in literature as well, with appropriate cocrystals designed in the laboratory improving solubility and dissolution of poorly soluble compounds and enhancing oral bioavailability in some cases.

Keywords: *Cocrystals, Coformer, poorly soluble drugs, Solubility enhancement; Bioavailability*

INADDP/PT/ON/34-P

"NEXT-GENERATION NANOPARTICLE-BASED NOSE-TO-BRAIN DRUG DELIVERY: A NOVEL STRATEGY FOR TARGETED THERAPY OF CENTRAL NERVOUS SYSTEM DISORDERS"

Pushker Singh Ruhela, Dr. Poonam Parashar*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028
Corresponding Author: pparashar@lko.amity.edu
Presenting Author: pushker.ruhela@s.amity.edu

Abstract:

Nanoparticle-Based Nose-to-Brain drug delivery has been considered as a promising non-invasive approach which can allow direct transport of drugs from the nasal cavity to the brain through the olfactory and trigeminal pathways, and thus reduce dependency on systematic circulation. The treatment of the Central Nervous System (CNS) is still hampered by the Blood-Brain Barrier (BBB), which restricts the transport of numerous brain therapeutic agents. However, limited nasal residence time, mucociliary clearance, enzymatic degradation, limited dose volume, and variable mucosal absorption may limit therapeutic efficacy. In addition to facilitating controlled or prolonged drug release, solid lipid nanoparticles (SLNs), polymeric nanoparticles, liposomes, nano-emulsions, micelles, and nanostructured lipid carriers (NLCs) can enhance drug solubility, stability, mucosal penetration, and retention. Additionally, their tunable surface properties and nanoscale

ISSN: 2584-2781

characteristics can improve drug accumulation in the brain and enable more accurate targeting of particular brain regions or receptors. It has improved brain exposure and direct transport for several nanoparticle-based intranasal formulations, and highlighted their potential in the management of neurological and psychiatric disorders. However, important challenge still remains in the formulation optimization, nasal tolerability, nanoparticle safety, dose control, stability, reproducibility, and translation from experimental models to clinical applications. Future development of nanoparticle-based nose-to-brain drug delivery should therefore focus on rational design of nanocarrier, optimized nasal deposition, surface engineering, prolonged residence time and robust pharmacokinetic and pharmacodynamic evaluation. In General, nanoparticle-enabled nose-to-brain delivery represent a promising next-generation platform for improving brain bioavailability and developing targeted therapies for CNS disorders, while potentially reducing systematic exposure and associated adverse effects and improving patient convenience and therapeutic efficiency.

Keywords: *Nose-to-brain delivery; Blood-brain barrier; CNS disorders; Brain Targeting; Nanocarrier; Lipid nanoparticles.*

INADDP/PT/ON/35-P

ROLE OF EXCIPIENTS IN PHARMACEUTICAL FORMULATION

Rudransh Ranjani 1, Shashank Soni2

*1. Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus – 226028
Email Id: ssoni@lko.amity.edu

Abstract

Pharmaceutical excipients are inert substances incorporated into drug formulations to aid in the manufacturing process, improve stability, enhance bioavailability, and facilitate patient compliance. Although they do not possess intrinsic therapeutic activity. excipients play acritical role in determining the safety, efficacy, and quality of pharmaceutical products. Common excipients include diluents, binders, disintegrants, lubricants, surfactants, and preservatives. With the increasing complexity of drug formulations, selection and characterization of excipients have become a vital aspect of pharmaceutical development. Regulatory agencies emphasize rigorous testing, quality control, and compatibility studies to ensure excipient safety and performance. This article provides a comprehensive overview of pharmaceutical excipients, their classification, functions, applications, and regulatory considerations.

ISSN: 2584-2781

Keywords- *Pharmaceutical excipients; Drug formulation; Binders; Diluents; Disintegrants; Lubricants; Surfactants; Preservatives; Quality control; Drug stability; Bioavailability; Regulatory guidelines; Compatibility studies; Pharmaceutical manufacturing; Dosage form*

INADDP/PT/ON/36-P

RECENT ADVANCES IN AI-INTEGRATED SMART POLYMERS FOR CONTROLLED DRUG DELIVERY AND THERAPEUTIC APPLICATIONS

Rishabh Singh1, Nimisha1*,
*1*Professor, Department of Pharmaceutics*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow 226028 (India)
E-mail address: rishabh.singh29@s.amity.edu, nsrivastava3@lko.amity.edu

Abstract

Artificial Intelligence (AI) is an emerging transformation in polymer materials research. It is changing the way materials are discovered, characterized and optimized. Polymer science has progressed considerably but is still primarily reliant on conventional experience-based research approaches causing a slow rate of innovation. The urgency for the field of polymer research to adopt a paradigm shift focusing on data-driven research using AI and machine learning is highlighted in this review. Advances in AI show that AI can support polymer design and accurately predict material properties and optimize polymer processing conditions while reducing the number of hours conducting experiments to obtain data. Lowering the number of experiments needed to design and develop new polymer products continues to be a challenge due to several barriers on the way of obtaining and using high-quality polymer data. Barriers include: the scarcity of high-quality data sets; the absence of standardized and meaningful descriptors for polymers; and the increasing complexity of developing and implementing algorithms. Traditionally, these barriers have limited the reliability, usability, and broader application of models. This review presents some emerging solutions for addressing these issues (e.g., development of collaborative/open-access polymer databases, domain-specific descriptor development, and the use of active learning strategies to combine experimental data with model development). In addition, the critical importance of generating and providing high-quality polymer data and creating explainable AI frameworks to increase the transparency and credibility of AI predictions is emphasized as these provide solutions for overcoming the computational barriers and challenges associated with AI while ensuring data quality and credibility of predictions.

ISSN: 2584-2781

Keywords: *Artificial intelligence; smart polymers; polymer design; research database; descriptors; algorithm*

INADDP/PT/ON/37-P

MARINE BASED NANOTHERAPEUTICS IN THE MANAGEMENT OF RHEUMATOID ARTHRITIS: A REVIEW

Yash Pandey[1], Shashank Soni[2]*

Amity Institute of Pharmacy, Amity University Uttar Pradesh Lucknow Campus, Lucknow226028, India

Corresponding Author – ssoni@lko.amity.edu
Presenting Author – yash.pandey7@s.amity.edu

Abstract:

Rheumatoid arthritis (RA) is a chronic autoimmune disease that causes persistent joint inflammation, pain, and progressive damage to cartilage and other joint structures. Although conventional treatments, including non-steroidal anti-inflammatory drugs (NSAIDs) and diseasemodifying antirheumatic drugs (DMARDs), are widely used, their long-term application may be limited by systemic adverse effects and inadequate drug delivery to inflamed joints. Marine organisms have emerged as a promising source of bioactive compounds with potential therapeutic applications in RA. Peptides, polysaccharides, and omega-3 polyunsaturated fatty acids obtained from marine sources have demonstrated anti-inflammatory and immunomodulatory properties. However, the clinical use of many of these compounds is limited by poor water solubility, instability, rapid metabolism, and low bioavailability. Nanotechnology offers a promising approach to overcome these limitations. Incorporating marine-derived bioactive into nanocarriers, including liposomes, polymeric nanoparticles, and solid lipid nanoparticles, may improve their stability, solubility, and cellular uptake. These systems can also be designed to enhance drug accumulation at inflamed synovial tissues, potentially improving therapeutic outcomes while reducing unwanted systemic effects. This review examines recent developments in marine-based nanomedicines for the management of RA. It discusses the mechanisms through which marine bioactive may regulate inflammatory pathways and highlights the role of nanocarriers in improving their therapeutic performance. The review also considers formulation challenges, scale-up requirements, and the key steps involved in translating these systems from laboratory research to clinical application. Overall, the combination of marine-derived bioactive compounds and nanotechnology represents a promising area of research for developing more effective and targeted approaches to RA treatment.

Keywords: *Rheumatoid arthritis, Nanotechnology, Marine device compounds, NASIDS (Non-steroidal anti-inflammatory drugs), Marine derivatives*.

ISSN: 2584-2781

INADDP/PT/ON/38-P

DEVELOPMENT OF A SPRAYABLE NANOHYDROGEL–INTEGRATED POROUS CHITOSAN WAFER FOR ENHANCED DIABETIC WOUND HEALING.

Authors: *Mr. Sayyed F Tahir*, Dr.Karuna N Nagula
Affiliation: Amity Institute of Pharmacy, Amity University Maharashtra

Abstract:

Diabetic wounds, particularly diabetic foot ulcers, represent a major clinical challenge due to persistent microbial infection, oxidative stress, impaired vascularization, prolonged inflammation, and delayed tissue regeneration. Conventional management frequently relies on systemic antibiotics and conventional wound dressings, which may result in inadequate local drug concentration and systemic adverse effects. The present study proposes the development of an innovative hybrid topical drug delivery system comprising a Linezolid-loaded sprayable nanohydrogel integrated with a porous chitosan wafer for effective diabetic wound management. Linezolid-loaded chitosan nanoparticles will be prepared and incorporated into a Carbopol-based sprayable hydrogel to provide rapid and uniform topical antimicrobial action. A porous chitosan wafer will be developed using polymeric casting followed by freezing and lyophilization, serving as a bioadhesive matrix for sustained localized drug release, moisture retention, exudate management, and wound protection. The hybrid system is designed to provide biphasic drug release, combining immediate antimicrobial activity from the nanohydrogel with prolonged drug release from the porous wafer. The formulations will be characterized for physicochemical properties, particle size, polydispersity index, zeta potential, entrapment efficiency, spray characteristics, porosity, swelling, bioadhesion, drug release, and stability. In vivo evaluation in alloxan-induced diabetic rats is proposed to assess wound healing efficacy. The proposed system may offer an effective localized approach for reducing microbial burden and improving diabetic wound healing.

Keywords: *Linezolid; Nanohydrogel; Chitosan; Porous wafer; Diabetic wound; Sprayable gel; Biphasic drug release; Topical drug delivery.*

INADDP/PT/ON/39-P

AI-ENABLED NANOINFORMATICS FOR TARGET NANOCARRIER CO-DESIGN:AN INTEGRATED PLATFORM FOR NEXT GENERATION DRUG DISCOVERY.

Abhishek Rajput, Neeraj Mishra*
Amity Institute of pharmacy, Amity University Madhya Pradesh, Gwalior India
Email- neerajdops@gmail.com /abhishek.rajput5@s.amity.edu

ISSN: 2584-2781

Abstract:

Artificial Intelligence (AI) and nanotechnology are converging to transform drug discovery, providing new avenues to rapidly identify therapeutic targets while simultaneously designing optimized nanocarriers for their delivery. Target identification and drug delivery vehicle design have traditionally been treated as two separate stages, an approach that is inefficient and often leads to longer development timelines and suboptimal therapeutic outcomes. In this work, we propose an AI-based "nanoinformatics" platform that enables the co-design of molecular targets and nanocarriers within a single integrated computational framework. The platform combines machine learning algorithms, predictive modelling, and large-scale biological and nanomaterial datasets to simultaneously assess target drug ability, binding affinity, and physicochemical compatibility for candidate nanocarrier architectures, including lipid nanoparticles, polymeric systems, and dendrimers. This co-design approach allows real-time adaptation of nanocarrier surface chemistry, size, and release kinetics according to target-specific biological barriers, thereby enhancing bioavailability, tissue specificity, and therapeutic efficacy. Furthermore, the platform incorporates predictive toxicity screening and pharmacokinetic modelling to reduce the high attrition rates commonly associated with late-stage nanomedicine development. Preliminary conceptual validation demonstrates the feasibility of this approach to significantly compress discovery-to-delivery timelines, while also enabling personalized therapeutic design based on patient-specific molecular profiles. This represents a paradigm shift from siloed to integrated target–nanocarrier engineering, marking a foundational step toward truly intelligent and adaptive drug discovery systems. Overall, the proposed framework holds substantial potential for applications across oncology, infectious diseases, and genetic disorders, positioning AI-driven nanoinformatics as a transformative force in next-generation precision therapeutics.

Keywords: *Nanoinformatics; Artificial Intelligence; Target Nanocarrier Co-Design; Drug Discovery.*

INADDP/PT/OF/40-P

MUPIROCIN-LOADED NANOSPANLASTIC TOPICAL GEL FOR ENHANCED ANTIBACTERIAL THERAPY OF BACTERIAL SKIN INFECTIONS

Janhvi Maurya[1], Singh Shekhar Gautam[2]*

Department of pharmaceutics, Department of pharmaceutics United Institute of Pharmacy Naini, Prayagraj 211010 India

Email- janhvimaurya2003@gmail.com

Abstract:

Bacterial skin infections represent a significant therapeutic challenge due to microbial colonization, delayed healing,

ISSN: 2584-2781

recurrent infection, and increasing antimicrobial resistance. Conventional topical formulations may have limitations in achieving sustained drug release and effective drug deposition at the site of infection because of the protective nature of the stratum corneum. Mupirocin is a widely used topical antibacterial agent with potent activity against Grampositive bacteria, particularly Staphylococcus aureus, including methicillin-resistant S. aureus. The present study aims to develop and characterize mupirocin-loaded nanospanlastics incorporated into a topical gel for enhanced antibacterial therapy of bacterial skin infections. Nanospanlastics will be prepared using the ethanol injection method with Span 60 as the non-ionic surfactant and Tween 80 as the edge activator. The prepared nanospanlastics will be characterized for particle size, polydispersity index, zeta potential, entrapment efficiency, and surface morphology. The optimized mupirocin-loaded nanospanlastics will subsequently be incorporated into Carbopol 934 gel and evaluated for pH, viscosity, spreadability, homogeneity, extrudability, and drug content. In-vitro drug release and ex-vivo skin permeation studies will be performed to assess sustained drug release and skin delivery characteristics. The optimized formulation will further be evaluated for antibacterial activity against selected bacterial pathogens. The developed nanospanlastic gel is expected to enhance topical drug deposition, provide sustained drug release, and improve antibacterial efficacy, thereby offering a promising nanotechnology-based approach for the topical management of bacterial skin infections.

Keywords: *Mupirocin, Nanospanlastics, Topical gel, Bacterial skin infections, Antibacterial activity, Nanotechnology*.

INADDP/PT/OF/41-P

ETHOSOMAL GEL: AN APPROACH FOR ENHANCED TOPICAL DRUG DELIVERY

Abhishek Maurya[1], Amit Kumar Singh[2]*
Department of Pharmaceutics, United Institute of Pharmacy, Naini, Prayagraj
Email: mauryaabhisek472@gmail.com

Abstract:

Topical drug delivery is a convenient route for localized therapy; however, the stratum corneum acts as a major barrier to drug penetration. Ethosomal gel is an advanced vesicular drug delivery system designed to improve skin permeation and therapeutic efficacy. Ethosomes are flexible lipid vesicles composed mainly of phospholipids, ethanol and water. The presence of ethanol enhances vesicle flexibility and facilitates penetration through the stratum corneum, promoting deeper drug deposition. Incorporation of ethosomes into a suitable gel base improves viscosity, spreadability, stability, residence time and patient acceptability. The formulation can be evaluated for vesicle size, polydispersity index, zeta potential, entrapment

ISSN: 2584-2781

efficiency, drug content, pH, viscosity, spreadability, in-vitro drug release, ex-vivo skin permeation and stability. Ethosomal gel can provide enhanced drug permeation, prolonged drug release and improved skin retention compared with conventional topical formulations. Therefore, ethosomal gel represents a promising approach for effective and targeted topical drug delivery with potential applications in various dermatological conditions.

Keywords: *Ethosomes, Topical drug delivery, Vesicular system, Skin permeation, Ethanol, Gel.*

INADDP/PT/OF/42-P

NANOTECHNOLOGY-BASED ORAL DRUG DELIVERY SYSTEMS

Rajnikant[1], Rashmi Keshri[2*], Payal Gupta[3], Payal Chaurasiya[4], Vivek Kumar[5]

Kashi Institute of Pharmacy, Varanasi-Allahabad Highway (NH-2), Mirzamurad, Varanasi, UP -221307

Abstract:

Nanotechnology has emerged as a promising approach for improving the effectiveness of oral drug delivery systems. Conventional oral dosage forms often face challenges such as poor aqueous solubility, low bioavailability, enzymatic degradation, and limited absorption of certain drugs. The objective of the poster is to explore the potential of nanotechnology-based oral drug delivery systems in improving drug solubility, bioavailability, controlled release, and therapeutic efficacy Nanotechnology-based drug delivery systems use nanoscale carriers such as nanoparticles, nanostructured lipid carriers, nano emulsions, liposomes, and polymeric nanoparticles to overcome these limitations. These systems can enhance drug solubility, protect drugs from degradation, improve gastrointestinal absorption, and provide controlled or sustained drug release. Nanocarriers may also facilitate targeted delivery and reduce unwanted side effects by improving drug distribution. The application of nanotechnology in oral drug delivery therefore offers significant potential for improving therapeutic efficacy, patient compliance, and the overall performance of poorly bioavailable drugs. However, challenges related to formulation stability, toxicity, scalability, regulatory requirements, and cost need to be addressed for successful clinical application. Overall, nanotechnology-based oral drug delivery represents an innovative strategy for developing safer, more effective, and patient-friendly pharmaceutical formulations.

Keywords; Nanotechnology, Oral Drug Delivery, Nanoparticles, Bioavailability, Controlled Release, Nano emulsion, Liposomes, Drug Absorption.

INADDP/PT/OF/43-P

CUBOSOMES: A NOVEL LIPID-

ISSN: 2584-2781

BASED NANOCARRIER FOR ADVANCED DRUG DELIVERY SYSTEMS

Ankita Yadav[1], Prof. (Dr.) Shanti Bhushan Mishra[2]*
Department of Pharmaceutics, United Institute of Pharmacy Professor, Department of Pharmacognosy, United Institute of Pharmacy

Abstract:

Nanotechnology has emerged as a transformative approach in modern pharmaceutical research, offering innovative solutions to overcome challenges associated with conventional drug delivery systems, such as poor aqueous solubility, low bioavailability, and lack of target specificity. Among diverse nanocarriers, cubosomes are self-assembled, bicontinuous liquid crystalline nanoparticles comprising an internal cubic crystalline architecture with interconnected water channels. Typically formed from amphiphilic lipids (e.g., monoolein, phytantriol) and stabilized by polymeric agents like poloxamer 407, their unique honeycomb-like structure provides a large interfacial surface area that enables the encapsulation of hydrophilic, lipophilic, and amphiphilic therapeutic agents. Cubosomes exhibit remarkable thermodynamic stability, biocompatibility, biodegradability, and mucoadhesive properties, making them highly suitable for oral, topical, ocular, parenteral, and targeted delivery routes. Primary formulation techniques include top down (fragmentation) and bottom-up (precipitation) approaches, which dictate their particle size, physicochemical properties, and overall structural organization. Recent literature demonstrates their capability to improve drug solubility, enhance bioavailability, facilitate controlled release, and allow site-specific targeting, with promising outcomes in cancer therapy, antimicrobial treatments, and personalized medicine while minimizing adverse effects. However, challenges regarding physical instability during storage, long-term stability maintenance, large-scale manufacturing complexity, and high production costs remain critical areas for further optimization. This review highlights the structural versatility, formulation methodologies, and advancing therapeutic applications of cubosomes, underscoring their potential as next-generation nanocarriers in modern medicine.

Keywords: *Cubosomes, Nanotechnology, Liquid Crystalline Nanoparticles, Drug Delivery Systems, Bioavailability Enhancement, Controlled Release*

INADDP/PT/OF/44-P

BEYOND THE OCULAR BARRIERS: NANOTECHNOLOGY-ENABLED PRECISION THERAPY FOR ANTERIOR AND POSTERIOR SEGMENT DISORDERS

Sumit Singh[1], Prakhar Pandey[2], Dr. Prakash Chandra Gupta[3]*
Department of Pharmacology, School of

ISSN: 2584-2781

Pharmaceutical Sciences, Chhatrapati Shahu Ji Maharaj University, Kanpur, 208024, U.P., India
***Email**: singhsumit919894@gmail.com, prakharpandey277@gmail.com*

Abstract:

Therapeutical eye therapy is restricted by static and dynamic ocular barriers with extremely high specificity, which restrict drug penetration into anterior and posterior ocular segments. Static ocular barriers comprise cornea epithelium, conjunctiva, sclera, blood–aqueous and blood–retinal barriers, whereas dynamic ocular barriers include tear dynamics, blinking, nasolacrimal drainage, aqueous humor dynamics, and efflux systems. Nanotechnology appears as a rational approach to circumvent limitations in molecular penetration and ocular drug residence using liposomes, polymeric nanoparticles, nanoemulsions, dendrimers, and solid lipid nanoparticles (SLNs). Clinical relevance is seen through the availability of marketable products based on nanotechnology, including Restasis (cyclosporine nanoemulsion), Durezol (difluprednate nanoemulsion), Cequa (cyclosporine nanomicellar solution), and Inveltys (submicron loteprednol formulation). Apart from ocular surface diseases and postoperative ocular inflammation, advanced nanoscale drug carriers are investigated in glaucoma, diabetic retinopathy, and age-related macular degeneration (AMD) to reduce the frequency of treatment and avoid invasive administration. However, clinical relevance is currently limited due to potential ocular toxicity, nanomaterial clearance, batch variability, sterilization issues, and lack of scalable production and characterization approaches for novel nanomaterials. Advances in the field would depend on the development of biodegradable, disease responsive and targeted nanocarriers with an understanding of anatomical and pharmacokinetics ocular barriers related to specific disease entities for non-invasive drug administration.

Keywords: *Ocular nanotechnology, glaucoma, diabetic retinopathy, age-related macular degeneration, nanocarriers*

INADDP/PT/OF/45-P

NANOTECHNOLOGY IN PARKINSON'S DISEASE: NOVEL APPROACHES FOR TARGETED DRUG DELIVERY

Rajat Rathaur[1], Akansha Mishra[2], Shristi Yadav[3], Dr. Ajay Kumar Gupta[4]*

[1]*School of Pharmaceutical Sciences, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India*
[2]*School of Pharmaceutical Sciences, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India*
[3]*School of Pharmaceutical Sciences, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India*

ISSN: 2584-2781

[4]*School of Pharmaceutical Sciences, Chhatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India*

Abstract:

Parkinson's disease (PD) is a progressive disorder affecting the nervous system, mainly by the degeneration of dopaminergic neurons in the substantia nigra and leading to an imbalance in motor and non-motor activities. Although current therapies, especially dopaminergic drugs, provide symptomatic relief, their therapeutic effectiveness may be limited by the restrictive nature of the blood–brain barrier. Nanotechnology has emerged as a promising strategy to address these challenges by enabling targeted and controlled delivery of therapeutic agents to the central nervous system. This poster focuses on recent advancements in nanotechnology-based approaches for the treatment of Parkinson's disease, with attention given to liposomes, nanoparticles, dendrimers and exosome-based systems. Various targeting strategies, including surface modification, receptor-mediated transport and intranasal nose-to-brain delivery, are discussed for improving BBB penetration and enhancing drug accumulation at desired sites. The potential applications of nanocarriers for dopaminergic therapy, neuroprotection and delivery of therapeutics are also explored. Although promising results have been reported in preclinical studies, challenges concerning nanoparticle toxicity, long-term safety, manufacturing, reproducibility and clinical translation still exist. Ongoing research combining nanotechnology with pharmacology and advanced therapeutic strategies could contribute to the development of safer, more precise and effective treatments for Parkinson's disease.

Keywords: *Parkinson's disease, Nanotechnology, Blood–brain barrier, Nose-to-brain delivery, Targeted drug delivery*

INADDP/PT/OF/46-P

IMPLANTABLE DRUG DELIVERY SYSTEMS: CURRENT ADVANCES AND FUTURE PERSPECTIVES

Supriya Prajapati[1], Amit Yadav[2*]
S.N. College of Pharmacy,(affiliated to AKTU), Jaunpur ,Uttar Pradesh 222132
Email- *supriyapra655@gmail.com , ay3681158@gmail.com*

Abstract:

Implantable drug delivery systems (IDDS) offer a controlled, sustained, and site-specific approach to drug administration, distinguishing them from conventional dosage forms. By maintaining therapeutic drug concentrations over extended periods, these systems reduce dosing frequency and minimize systemic side effects. Advances in biomaterials, nanotechnology, microfabrication, and 3D printing have enabled the development of biodegradable implants, nanoparticle-based carriers, drug-eluting

ISSN: 2584-2781

devices, and miniaturized programmable systems. Stimuli-responsive implants designed to react to internal cues such as pH, enzymes, and reactive oxygen species, or external triggers like light, ultrasound, magnetic fields, and electrical signals—have further improved precision in drug release. Closed-loop and remotely controlled systems are also emerging, allowing real-time dosage adjustments tailored to individual therapeutic needs. These technologies are currently used in oncology, neurology, ophthalmology, chronic disease management, hormone therapy, and localized antimicrobial treatment. However, challenges persist, including biocompatibility, implant stability, limited drug-loading capacity, burst release, sterilization, miniaturization, power supply, manufacturing scalability, and regulatory approval. Future directions point toward smart biodegradable materials, self-powered wireless implants, AI-assisted dose optimization, biosensor integration, personalized 3D-printed devices, and fully closed-loop delivery systems. Together, these innovations may transform implantable systems from passive drug reservoirs into intelligent, responsive therapeutic platforms-advancing precision medicine and improving patient adherence and clinical outcomes.

Keywords: *Implantable drug delivery, controlled release, biodegradable polymers, biomaterials, stimuli-responsive systems, bioresorbable implants*

INADDP/PT/OF/47-P

CRITICAL ANALYSIS OF DEMERITS AND TRANSLATIONAL LIMITATIONS OF STIMULI-RESPONSIVE NANOGELS IN TOPICAL SCALP DELIVERY FOR HAIR FALL INHIBITION

Khushi verma[1], khushi kumari[2], Md Kaish[3*] Divyash Singh[4]
Himalayan Institute of Pharmacy & Research, BKT, Lucknow
Email- *mdkaish123786@gmail.com*

Abstract:

Hair fall remains a prevalent dermatological and cosmetic concern, often associated with androgenetic alopecia, inflammation, oxidative stress, impaired follicular function, and alterations in the scalp microenvironment. Stimuli-responsive nanogels have emerged as promising topical delivery systems because they can potentially respond to endogenous or external triggers, such as pH, temperature, reactive oxygen species, enzymes, light, or electrical stimuli, enabling controlled and site-specific drug release. Their high water content, biocompatibility, tunable network structure, and ability to improve drug solubilization and retention have generated considerable interest for scalp delivery of anti-hair-fall therapeutics. However, despite encouraging preclinical findings, substantial translational limitations remain insufficiently addressed. This critical analysis highlights the major demerits associated

ISSN: 2584-2781

with stimuli-responsive nanogels in their transition from laboratory development to clinical application. Scalp-specific physiological variability, including differences in pH, temperature, sebum production, hair density, follicular structure, and disease state, may compromise the reproducibility and predictability of stimulus-triggered responses. Limited follicular penetration, uncontrolled drug release, premature leakage, nanoparticle aggregation, formulation instability, and interference from sebum and hair products represent additional challenges. Complex synthesis and functionalization can increase manufacturing costs, reduce batch-to-batch reproducibility, and complicate large-scale production and quality control. Furthermore, long-term scalp safety, local irritation, sensitization, accumulation of nanomaterials, and potential systemic exposure require rigorous investigation. The absence of standardized in vitro scalp models, predictive animal models, clinically relevant endpoints, and harmonized regulatory guidelines further restricts translation. Therefore, future development should prioritize simple and scalable formulations, clinically relevant stimulus selection, robust safety evaluation, standardized follicular delivery models, and well-designed human trials. Addressing these limitations is essential before stimuli-responsive nanogels can be realistically translated into effective and commercially viable topical therapies for hair fall inhibition.

Keywords: *Stimuli-responsive nanogels; Hair fall inhibition; Topical scalp delivery; Follicular targeting; Translational limitations*

INADDP/PT/OF/48-P

NANO-PHENOTYPE FINGERPRINTING FOR EARLY CANCER DETECTION

Rashmi Keshri[1], Payal Gupta[2], Payal Chaurasiya[3], Rajnikant[4], Vivek Kumar[5]
Kashi Institute of Pharmacy, Varanasi-Allahabad Highway (NH-2), Mirzamurad, Varanasi, UP -221307

Abstract:

Recent approaches to cancer drug discovery are based upon the knowledge of specific genes, proteins or pathways that contribute to cancer development. However, many of these early changes in cancer cells are often undetectable prior to the development of visible changes in those cells. The objective of the poster is to explore the potential of Nano-Phenotype Fingerprinting (NPF) using multifunctional nano-sensors and artificial intelligence to identify nanoscale changes in cancer cells and novel therapeutic targets, and facilitate phenotype-based cancer drug discovery. These different signals would create a unique nano-phenotypic fingerprint for each type of cancer cell. By comparing the fingerprints of healthy versus cancer cells using AI, it is possible to identify the hidden patterns in the nano-phenotypes that are associated with those

ISSN: 2584-2781

cancer cells. These hidden patterns can then be correlated with specific molecular pathways that can inform potential therapeutic targets. In addition to screening for drugs that can inhibit the activity of these genes, it may also be possible to screen for drugs that are able to reverse the abnormal nano-phenotype of cancer cells. Thus, a new method for discovering potential targets for cancer treatments has been proposed. NPF uses multifunctional nano sensors to detect various changes at the nanoscale within cancer cells. The Nano-Phenotype Fingerprinting approach could potentially revolutionize the process of discovering new cancer drugs by shifting from a target-based approach to a phenotype-based model of discovering effective cancer treatments. This approach could enable the discovery of potential vulnerabilities in cancer cells and the development of targeted treatments for those cancers.

Keywords: *Nanotechnology, Nano-Phenotype Fingerprinting, Nano-sensors, Artificial Intelligence, Cancer Drug Discovery, Therapeutic Targets*.

INADDP/PT/OF/49-P

SOLID LIPID NANOPARTICLES FOR TOPICAL DRUG DELIVERY: A PROMISING APPROACH FOR ENHANCED SKIN PENETRATION

Utpal Pandey[1] Dr. Amit Kumar Singh[2]*
United Institute of Pharmacy, UCER A-31/1, UPSIDC Industrial Area, Naini, Prayagraj–211010

Abstract:

Topical drug delivery is a convenient and effective approach for treating various skin disorders because it allows direct delivery of the drug to the affected site while minimizing systemic exposure. However, conventional topical formulations may have limitations such as poor aqueous solubility, low skin penetration, rapid drug removal, and inadequate drug retention. Solid lipid nanoparticles (SLNs) have emerged as a promising lipid-based nanocarrier system for overcoming these limitations and improving topical drug delivery. SLNs are composed of biocompatible solid lipids stabilized with suitable surfactants and generally possess a nanosized structure. Their small particle size and lipidic characteristics provide a large surface area and may enhance skin adhesion, hydration, drug penetration, and retention within the skin. SLNs can also protect incorporated drugs from degradation and provide controlled and sustained drug release, which may improve therapeutic performance. Various methods, including high-pressure homogenization, ultrasonication, solvent emulsification-evaporation, and microemulsion techniques, can be used for the preparation of SLNs. The prepared nanoparticles are generally evaluated for particle size, polydispersity index, zeta potential, entrapment efficiency, drug content, morphology, in-vitro drug release, physical stability, and skin permeation. SLNs have shown considerable potential for the topical delivery of antifungal, antibacterial, anti-

ISSN: 2584-2781

inflammatory, and other therapeutic agents. Therefore, SLN-based topical drug delivery represents a promising approach for enhancing skin penetration and drug retention while providing sustained drug release and improved therapeutic efficacy. This technology may offer significant potential for the development of advanced topical pharmaceutical formulations.

Keywords: *Solid Lipid Nanoparticles; Topical Drug Delivery; Skin Penetration; Controlled Drug Release; Nanocarriers*

INADDP/PT/OF/50-P

NANOPARTICLE- BASED TARGETED THERAPIES FOR CANCER

Abhishek Pandit[1], Dinesh Maurya[2*], Ali Athar[3]

Department of Pharmacy, Faculty of Pharmacy, Integral University, Lucknow, Uttar Pradesh - India (226026)
Email- *abhishkbp@student.iul.ac.in*

Abstract:

Nanoparticle-based targeted therapy is reshaping how we treat cancer by overcoming the systemic toxicity and poor tumour selectivity that limit conventional chemotherapy. Carriers such as liposomes, polymeric nanoparticles, dendrimers, and metallic nanoparticles (gold, iron oxide, hafnium oxide) exploit both passive accumulation through the enhanced permeability and retention (EPR) effect and active targeting via surface-conjugated antibodies, peptides, or aptamers that recognise receptors overexpressed on tumour cells. This dual strategy concentrates drug at the tumour site while sparing healthy tissue, improving efficacy and reducing side effects. Beyond drug delivery, nanoparticles now underpin theranostic platforms that combine imaging (MRI, photoacoustic tomography) with therapy, and stimuli-responsive designs release their payload in response to tumour pH or enzyme cues for tighter spatial control. Recent clinical progress illustrates this shift: lipid-nanoparticle-formulated mRNA cancer vaccines, such as intismeran autogene (mRNA-4157/V940) combined with pembrolizumab, met their primary endpoint in a 2026 Phase 3 melanoma trial, while NBTXR3, a radiation-activated hafnium oxide nanoparticle, is being evaluated across lung, head-and-neck, and sarcoma cancers as a first-in-class radioenhancer. Despite this momentum, nanotoxicity, scale-up manufacturing, batch-to-batch variability, and inconsistent EPR behaviour across tumour types remain real hurdles to clinical translation, alongside evolving regulatory expectations. Looking ahead, personalised nanomedicine, biomimetic coatings that evade immune clearance, and combination strategies with immunotherapy are likely to define the next generation of cancer nanotherapeutics.

Keywords: *Nanoparticles, Targeted drug delivery, Tumour microenvironment,*

ISSN: 2584-2781

Theranostics, Lipid nanoparticles, Cancer nanomedicine

INADDP/PT/OF/51-P

Smart Nanocarriers for Controlled Drug Delivery

*Payal Chaurasiya**, Rajnikant, Rashmi Keshri, Payal Gupta, Vivek Kumar
Kashi Institute of Pharmacy, Varanasi–Allahabad Highway (NH-2), Mirzamurad, Varanasi, UP -221307
Email-
payalchaurasiya0012@gmail.com

Abstract;

Smart nanocarriers are emerging as advanced drug delivery systems designed to improve the effectiveness, safety, and precision of conventional therapies. The objective of the poster is to explore the potential of smart nanocarriers in achieving targeted, controlled, and sustained drug delivery while improving therapeutic efficacy and reducing unwanted effects These nanoscale carriers can encapsulate therapeutic agents and deliver them to specific tissues or cells while providing controlled and sustained drug release. Various nanocarriers, including liposomes, polymeric nanoparticles, dendrimers, micelles, and lipid-based nanoparticles, have been investigated for their potential in modern drug delivery. Smart nanocarriers can be engineered to respond to specific biological or external stimuli, such as changes in pH, temperature, enzymes, light, or magnetic fields. This stimulus-responsive behaviours enables the drug to be released preferentially at the desired site and at an appropriate rate, which may improve therapeutic efficacy and reduce unwanted exposure to healthy tissues. Targeted nanocarriers can also be modified with specific ligands or surface molecules to enhance cellular uptake and tissue selectivity. These systems have potential applications in cancer therapy, antimicrobial treatment, gene delivery, and treatment of various chronic diseases. Despite their promising advantages, challenges such as toxicity, stability, drug-loading capacity, manufacturing complexity, cost, and regulatory requirements need to be addressed. Continued research and technological development may help translate smart nanocarriers into safer and more efficient therapeutic platforms.

Keywords; *Smart nanocarriers; Controlled drug delivery; Nanotechnology; Targeted drug delivery; Stimuli-responsive systems; Nanomedicine; Sustained release; Drug delivery syste*

INADDP/PT/OF/52-P

TABLET COATING TECHNOLOGY: PRINCIPLES, PROCESS AND RECENT ADVANCES

Amit Yadav
B. pharm 4th year/S N College Of Pharmacy,(affiliated to AKTU), Jaunpur,

ISSN: 2584-2781

Uttar Pradesh 222132
Email: ay3681158@email.com

Abstract:

Tablet coating is an important pharmaceutical manufacturing process used to improve the taste, stability, mechanical strength, appearance, and drug-release characteristics of solid oral dosage forms. Various coating techniques, including sugar coating, film coating, enteric coating, and functional coating, are selected according to therapeutic and formulation requirements. Among these, film coating is widely preferred because it provides a thin, uniform, and protective layer while allowing efficient processing. The coating process generally involves preparation of the coating formulation, loading of tablet cores, preheating, spraying, drying, and final curing or polishing. Critical process parameters such as spray rate, air temperature, airflow, pan speed, pressure, and coating formulation viscosity play an important role in determining coating quality and product performance. Proper control of these parameters helps minimize common coating defects such as sticking, peeling, and cracking. Recent advances include aqueous and solvent-free coating systems, modified-release polymers, moisture-protective coatings, taste-masking technologies, and continuous coating processes. The integration of Quality by Design (QbD), Process Analytical Technology (PAT), automation, and real-time monitoring has further improved process control, reproducibility, and product quality. Thus, modern tablet coating technology contributes significantly to pharmaceutical quality, stability, patient acceptability, and controlled drug delivery.

Keywords: *Tablet coating, Film coating, Enteric coating, Functional coating, Modified-release polymers, QbD, PAT, Drug delivery, pharmaceutical manufacturing, Coating technology.*

INADDP/PT/OF/53-P

AI-DRIVEN NANOPARTICLE DESIGN FOR NEXT-GENERATION DRUG DELIVERY

Aditya Kumar[1], Dr. Priya Pathak[2]
1Amity Institute of Pharmacy, Amity University, Lucknow Campus, Noida, Uttar Pradesh -226028, Lucknow.
2Dept. of Pharmacology, Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India.

E-mail*: aditya.kumar132@s.amity.edu1 , ppathak@lko.amity.edu2*

Abstract:

Nanoparticles — tiny drug-carrying particles thousands of times smaller than a human cell — are changing how medicines are delivered in the body. They can improve how well a drug dissolves, how long it stays active in the bloodstream, and how precisely it reaches the diseased tissue it's meant to treat.

ISSN: 2584-2781

However, designing the right nanoparticle for a specific drug is difficult, because scientists cannot always predict how it behaves once inside a living body. Artificial intelligence (AI) is now helping solve this problem. By learning from existing data on particle size, drug loading, and how nanoparticles move through the body, AI models can predict which designs are likely to work best before any lab experiments are run. More advanced AI methods can even suggest new nanoparticle structures that scientists might not have thought to try. Shared databases storing nanoparticle research data are also making it easier for scientists worldwide to compare results and build more reliable AI models. This poster explains the main types of nanoparticles used in drug delivery, shows how AI is applied at each stage of nanoparticle design from early screening to clinical testing and highlights a real success story: AI-designed lipid nanoparticles helped create the fast, effective COVID-19 mRNA vaccines. We also discuss current challenges, such as limited data and difficulty trusting AI's decision-making, and how future research aims to overcome them. Overall, combining nanotechnology with AI has strong potential to make drug delivery faster to develop, safer, and more personalized for patients.

Keywords- *Artificial Intelligence, Nanoparticles, Drug Delivery, Machine Learning, Nanomedicine, Lipid Nanoparticles*

INADDP/PT/OF/54-P

AI-DRIVEN NANOMEDICINE: INTEGRATING ARTIFICIAL INTELLIGENCE WITH NANOTECHNOLOGY FOR NEXT-GENERATION DRUG DISCOVERY AND DELIVERY

Piyush Gupta[1], Nishi Singh[2], Nidhi Yadav[3], Md Kaish[4*], Divyash Singh[5]
Himalayan Institute of Pharmacy & Research, BKT, Lucknow
Email- *mdkaish123786@gmail.com,*

Abstract:

The convergence of artificial intelligence (AI) and nanotechnology is emerging as a transformative approach for accelerating drug discovery and developing precision therapeutics. Conventional drug discovery and nanomedicine development often involve extensive experimental screening, formulation optimization, and trial-and-error approaches, resulting in considerable time, cost, and translational challenges. AI and machine learning (ML) offer data-driven solutions by integrating large and complex datasets to predict molecular interactions, identify therapeutic targets, optimize drug candidates, and rationally design nanocarriers. This review explores the emerging integration of AI with nanomedicine across the pharmaceutical development pipeline, from target identification and virtual screening to nanoparticle design, formulation optimization, drug loading, controlled

ISSN: 2584-2781

release, biodistribution, pharmacokinetic prediction, and nanotoxicity assessment. AI-assisted approaches can facilitate the selection and optimization of lipidic, polymeric, inorganic, and hybrid nanocarriers by predicting critical physicochemical and biological characteristics, thereby reducing dependence on conventional experimental optimization. Furthermore, intelligent nanocarriers coupled with predictive algorithms may enable targeted and personalized drug delivery by considering disease-specific and patient-specific biological parameters. Recent advances also highlight the potential of deep learning, generative AI, nano informatics, and automated experimentation to accelerate the development of next-generation nanotherapeutics. Despite these opportunities, significant challenges remain, including limited and heterogeneous datasets, model interpretability, reproducibility, biological complexity, scalability, regulatory uncertainty, and the need for rigorous experimental and clinical validation. Overall, the integration of AI and nanotechnology represents a paradigm shift from empirical to predictive nanomedicine and has the potential to accelerate the discovery, optimization, and clinical translation of safer, more effective, and personalized therapeutic systems.

Keywords: *Artificial Intelligence; Machine Learning; Nanomedicine; Nanocarriers; Drug Discovery*

INADDP/PT/OF/55-P

POLYMERS IN NANOTECHNOLOGY: SMART MATERIALS DRIVING INNOVATION IN DRUG DELIVERY, DIAGNOSTICS, AND BEYOND

Rahul Gupta1, Richa Srivastava1*,
1.Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow- 226028
***Email Id**: rsrivastava1@lko.amity.edu*

Abstract:

Polymer chemistry and nanotechnology are reshaping the landscape of biomedical science, opening doors to innovations once thought impossible. By crafting nanostructures such as nanoparticles, nanogels, micelles, and dendrimers, researchers have created highly versatile systems with tunable properties and adaptable designs. These smart materials are helping overcome long-standing challenges in therapies, diagnostics, and regenerative medicine. An exciting breakthrough lies in stimuli-responsive polymers—materials that can "switch" their structure when prompted by signals like pH, enzymes, or temperature, or by external cues such as light, magnetic fields, or ultrasound. This responsiveness allows drugs to be delivered with remarkable precision, improving solubility, bioavailability, and stability while reducing harmful side effects. Polymeric nanocarriers further enhance treatment by harnessing passive targeting mechanisms, such as the

ISSN: 2584-2781

Enhanced Permeability and Retention (EPR) effect in tumors, and active targeting through surface ligands. Their ability to cross biological barriers, including the blood–brain barrier, has opened new possibilities for treating neurodegenerative diseases and brain cancers. Beyond drug delivery, these polymers are being explored as safe, non-viral platforms for gene therapy, sidestepping the risks of traditional viral vectors. Their influence extends even further, inspiring advances in tissue engineering, responsive coatings, soft robotics, and environmental applications. The major challenges faced are large-scale reproducibility, regulatory hurdles, and long-term safety concerns which continue to slow clinical translation. Overcoming these barriers will require close collaboration between chemists, engineers, and clinicians. With such synergy, smart polymer nanomaterials are poised to become central to the future of precision medicine and beyond.

Keywords: *Smart Polymers, Stimuli-Responsive Nanocarriers, Controlled Drug Delivery, Gene Therapy Platforms, Precision Medici*

INADDP/PT/OF/56-P

DEVELOPMENT OF A SPRAYABLE NANOHYDROGEL–INTEGRATED POROUS CHITOSAN WAFER FOR ENHANCED DIABETIC WOUND HEALING.

Mr. Sayyed F Tahir, Dr.Karuna N Nagula
Affiliation:Amity Institute of Pharmacy, Amity University Maharashtra

Abstract:

Diabetic wounds, particularly diabetic foot ulcers, represent a major clinical challenge due to persistent microbial infection, oxidative stress, impaired vascularization, prolonged inflammation, and delayed tissue regeneration. Conventional management frequently relies on systemic antibiotics and conventional wound dressings, which may result in inadequate local drug concentration and systemic adverse effects. The present study proposes the development of an innovative hybrid topical drug delivery system comprising a Linezolid-loaded sprayable nanohydrogel integrated with a porous chitosan wafer for effective diabetic wound management. Linezolid-loaded chitosan nanoparticles will be prepared and incorporated into a Carbopol-based sprayable hydrogel to provide rapid and uniform topical antimicrobial action. A porous chitosan wafer will be developed

using polymeric casting followed by freezing and lyophilization, serving as a bioadhesive matrix for sustained localized drug release, moisture retention, exudate management, and wound protection. The hybrid system is designed to provide biphasic drug release, combining immediate antimicrobial activity from the nanohydrogel with prolonged drug release from the porous wafer. The formulations will be characterized for physicochemical properties, particle size, polydispersity

ISSN: 2584-2781

index, zeta potential, entrapment efficiency, spray characteristics, porosity, swelling, bioadhesion, drug release, and stability. In vivo evaluation in alloxan-induced diabetic rats is proposed to assess wound healing efficacy. The proposed system may offer an effective localized approach for reducing microbial burden and improving diabetic wound healing.

Keywords: *Linezolid; Nanohydrogel; Chitosan; Porous wafer; Diabetic wound; Sprayable gel; Biphasic drug release; Topical drug delivery.*

INADDP/PT/OF/57-P

HERBAL PHYTOSOMAL GEL: A NOVEL NANOTECHNOLOGY-BASED APPROACH FOR ACCELERATED WOUND HEALING

*Ankush Yadav** Dr. Prateek Pandey*
United institute of pharmacy, UCER A-31/1, UPSIDC Industrial area, Naini, Prayagraj-211010
***Email**: ankushdhema@gmail.com*

Abstract:

Wound healing is a complex physiological process involving inflammation, cell proliferation, collagen deposition, angiogenesis, and tissue remodeling. Despite the therapeutic potential of medicinal plants, conventional herbal formulations may show limitations due to poorsolubility, stability, skin permeation, and bioavailability of their active phytoconstituents. Phytosomal technology is an emerging nanotechnology-based approach that combines herbal bioactive compounds with phospholipids to improve their delivery and therapeutic performance. The present study aims to develop and evaluate a herbal phytosomal gel as an advanced topical formulation for enhanced wound healing. The herbal extract will be subjected to phytochemical screening and incorporated into phytosomes using a suitable phospholipid-based method. The prepared phytosomes will be characterized for particle size, polydispersity index, zeta potential,entrapment efficiency, and drug–excipient compatibility. The optimized phytosomal formulation will be incorporated into a gel and evaluated for pH, viscosity, spreadability, homogeneity, in-vitro release, and stability. Wound-healing efficacy will be assessed using an appropriate experimental wound model by evaluating wound contraction, epithelialization period, and histopathological changes. The developed formulation is expected to enhance topical delivery and promote aster wound repair.

Keyword: *Phytosome, Herbal gel, Nanotechnology, Wound healing, Topical delivery, Phytoconstituents*

ISSN: 2584-2781

INADDP/PT/OF/58-P

NANOTECHNOLOGY IN NEXT-GENERATION DRUG DEVELOPMENT

Pallavi[1], Richa Srivastava[1]*,
1.Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow- 226028
***Email Id**: rsrivastava1@lko.amity.edu*

Abstract:

Nanotechnology is transforming the way medicines are designed, developed, and delivered, offering new hope for patients and healthcare systems worldwide. By working at the nanoscale, scientists can create tiny carriers such as liposomes, polymeric nanoparticles, dendrimers, and nanogels that improve how drugs dissolve, remain stable, and are released inside the body. These carriers act like intelligent vehicles, guiding medicines to the right place, reducing harmful side effects, and making treatments more effective and patient-friendly. The "smart" nanomaterials can sense and respond to changes in their environment. Signals such as pH shifts, enzyme activity, or temperature variations trigger these materials to release drugs exactly where and when they are needed. This precision is especially valuable in treating complex diseases like cancer, neurodegenerative disorders, and infections, where targeted delivery can make a significant difference in outcomes. Researchers are also exploring hybrid approaches that combine nanotechnology with bioadhesive polymers, supramolecular chemistry, and 3D-printed scaffolds, opening new possibilities for oral, injectable, and implantable drug delivery systems. Scaling up production, navigating complex regulatory pathways, and ensuring long-term safety are critical hurdles. Progress will depend on strong collaboration between chemists, engineers, clinicians, and policymakers. Once these barriers are addressed, nanotechnology is poised to become a cornerstone of next-generation therapeutics, offering smarter, safer, and more precise medicines that can reshape the future of healthcare.

Keywords: *Nanotechnology, Drug delivery systems, Smart nanomaterials, Targeted therapeutics, Precision medicine, Bioavailability enhancement*

INADDP/PT/OF/59-P

NANOTECHNOLOGY IN SURGERY: THE FUTURE OF ULTRA – PRECISE AND MINIMALLY INVASIVE SURGERY

Kumari Jyoti, Suraj Singh Yadav
Kashi Institute of Pharmacy, Varanasi – 221307 (U.P.)

Abstract:

Nanotechnology is rapidly emerging as a transformative approach in modern surgical science, offering possibilities that extend beyond the limitations of

ISSN: 2584-2781

conventional human -performed procedures. It involves the manipulation of materials at the nanoscale (1 –100 nm), where unique properties enable highly precise medical applications. In surgery, nanotechnology enhances accuracy and efficiency by enabling interventions at the cellular and molecular level, which are beyond the capability of the human hand. Nano-engineered tools and future nanorobots can potentially navigate through blood vessels, identify diseased cells, and perform targeted actions with extreme precision. This reduces damage to surrounding healthy tissues, minimizes surgical errors, and significantly improves patient outcomes. Nanotechnology also improves implant technology and tissue regeneration. Nano-modified implant surfaces enhance biocompatibility, promote faster cell adhesion, and reduce the risk of rejection or failure. Additionally, nanoparticles are widely used for targeted drug delivery, ensuring that therapeutic agents act directly at the site of disease, thereby reducing systemic side effects. Another major advancement is the use of nano-sensors and smart monitoring systems, which allow real-time tracking of patient conditions after surgery. This enables early detection of complications and more personalized postoperative care. Although challenges such as safety, ethical concerns, and cost remain, nanotechnology has the potential to make surgeries more precise, less invasive, and more reliable than traditional human techniques. With continuous advancements, it may redefine the future of surgical practice.

Keywords: *Nanotechnology, minimally invasive surgery, Nanorobots, Target drug deliver*

INADDP/PT/OF/60-P

MICRONEEDLE BASED TRANSDERMAL DRUG DELIVERY: A PROMISING APPROACH FOR RHEUMATOID ARTHRITIS THERAPY

*Mala Yadav**, Yatish Yadav
Kashi Institute of Pharmacy, Mirzamurad, Varanasi, Uttar Pradesh – 221307

Abstract:

Rheumatoid Arthritis (RA) is a chronic autoimmune inflammatory disorder characterized by progressive symmetrical polyarthritis, primarily affecting small joints of the hands and feet, leading to cartilage destruction, bone erosion, and permanent disability. Conventional treatments including oral NSAIDs, corticosteroids, and parenteral administration are associated with limitations such as first-pass hepatic metabolism, poor bioavailability, gastrointestinal side effects, and low patient compliance. These challenges have necessitated alternative drug delivery approaches. Microneedle-assisted transdermal drug delivery has emerged as a minimally invasive, patient-friendly alternative for rheumatoid

ISSN: 2584-2781

arthritis management. These micron-scale devices create temporary microchannels across the stratum corneum, enhancing permeation of therapeutic agents while minimizing pain and bypassing hepatic first-pass metabolism. Microneedle-based systems are recognized as next-generation transdermal platforms with immense clinical potential. Recent advances have broadened microneedle technology beyond small-molecule drugs to include peptides, proteins, vaccines, nucleic acids, and nanocarrier-loaded formulations. Diverse architectures including solid, coated, hollow, dissolving, and hydrogel-forming types combined with biocompatible materials such as polymers, sugars, metals, ceramics, and hybrids provide flexibility in drug loading, controlled release, mechanical strength, and safety. For rheumatoid arthritis, microneedle systems offer targeted local drug delivery to inflamed joints, reducing systemic toxicity while improving therapeutic efficacy. They enable sustained release of DMARDs and biological agents, enhancing treatment outcomes. Preclinical studies have demonstrated significant improvement in drug permeation and patient compliance using microneedle-based formulations.

Keywords: *Microneedle, TDDS, Rheumatoid Arthritis, Transdermal Drug Delivery, Nanocarrier-loaded formulation, Biocompatible material*

INADDP/PT/OF/61-P

NANOPARTICLE- BASED TARGETED THERAPIES FOR CANCER

*Abhishek Pandit**, Dinesh Maurya, Ali Athar

Department of Pharmacy, Faculty of Pharmacy, Integral University, Lucknow, Uttar Pradesh - India (226026)

****Email*** *:abhishkbp@student.iul.ac.in*

Abstract:

Nanoparticle-based targeted therapy is reshaping how we treat cancer by overcoming the systemic toxicity and poor tumour selectivity that limit conventional chemotherapy. Carriers such as liposomes, polymeric nanoparticles, dendrimers, and metallic nanoparticles (gold, iron oxide, hafnium oxide) exploit both passive accumulation through the enhanced permeability and retention (EPR) effect and active targeting via surface-conjugated antibodies, peptides, or aptamers that recognise receptors overexpressed on tumour cells. This dual strategy concentrates drug at the tumour site while sparing healthy tissue, improving efficacy and reducing side effects. Beyond drug delivery, nanoparticles now underpin theranostic platforms that combine imaging (MRI, photoacoustic tomography) with therapy, and stimuli-responsive designs release their payload in response to tumour pH or enzyme cues for tighter spatial control. Recent clinical

ISSN: 2584-2781

progress illustrates this shift: lipid-nanoparticle-formulated mRNA cancer vaccines, such as intismeran autogene (mRNA-4157/V940) combined with pembrolizumab, met their primary endpoint in a 2026 Phase 3 melanoma trial, while NBTXR3, a radiation-activated hafnium oxide nanoparticle, is being evaluated across lung, head-and-neck, and sarcoma cancers as a first-in-class radioenhancer. Despite this momentum, nanotoxicity, scale-up manufacturing, batch-to-batch variability, and inconsistent EPR behaviour across tumour types remain real hurdles to clinical translation, alongside evolving regulatory expectations. Looking ahead, personalised nanomedicine, biomimetic coatings that evade immune clearance, and combination strategies with immunotherapy are likely to define the next generation of cancer nanotherapeutics.

Keywords: *Nanoparticles, Targeted drug delivery, Tumour microenvironment, Theranostics, Lipid nanoparticles, Cancer nanomedicine*

INADDP/PT/OF/62-P

HARNESSING BIOADHESIONFOR PROLONGED GASTRIC RETENTION: ROLE OF POLYMERS IN GRDDS

Pratishtha Rawat1, Dr. Richa Srivastava1*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow, 226028 (India)
Email*: rsrivastava1@lko.amity.edu*

Abstract:

Gastroretentive drug delivery systems (GRDDS) are designed to prolong the residence time of pharmaceutical dosage forms in the stomach, thereby enhancing the bioavailability and therapeutic efficacy of drugs that are preferentially absorbed in the stomach or upper intestine. Among the various strategies employed to achieve gastric retention, bio adhesion has emerged as a particularly effective approach. Bioadhesive polymers adhere to the gastric mucosa through hydrogen bonding, electrostatic interactions, van der Waals forces, and chain entanglement with mucus, thereby anchoring dosage forms to the stomach lining. This mechanism enables sustained drug release, improved plasma drug levels, and reduced dosing frequency. The performance of bioadhesive gastroretentive systems depends on multiple factors, including polymer molecular weight, viscosity, flexibility, functional group composition, hydration capacity, swelling behavior, and the physiological conditions of the stomach. Both natural and synthetic polymers have been extensively investigated, such as chitosan, sodium alginate, carbopol, polycarbophil, hydroxypropyl methylcellulose, and other cellulose derivatives. These polymers have been incorporated into diverse dosage forms including tablets, microspheres, beads, nanoparticles, and films, all of which contribute to prolonged gastric retention and controlled drug release. This review

ISSN: 2584-2781

highlights the principles of bioadhesion, the physicochemical properties of bioadhesive polymers, formulation strategies, evaluation methods, and the comparative advantages of bioadhesive systems over conventional drug delivery approaches. Current applications, existing challenges, and future perspectives are discussed, with emphasis on the development of innovative, patient-friendly gastroretentive dosage forms. Overall, bioadhesive polymer-based GRDDS represent a promising platform for improving therapeutic outcomes, particularly for drugs with narrow absorption windows, rapid degradation, or localized gastric action.

Keywords: *Bioadhesion, Bioadhesive polymers, Gastroretentive drug delivery system, Gastric retention, Mucoadhesion, Controlled drug delivery, GRDDS*

INADDP/PT/OF/63-P

NANOCRYSTAL-BASED DRUG DELIVERY SYSTEMS: A PROMISING APPROACH FOR POORLY SOLUBLE DRUGS

*Akash Pal**, Dr. Amit Kumar Singh*
United institute of pharmacy,UCER A-31/1,UPSIDC Industrial area, Naini,Prayagraj-211010
Email: *Apal75144@gmail.com*

Abstract:

Poor aqueous solubility is one of the major challenges encountered during the development of many therapeutic agents, as it can result in poor dissolution, low and variable bioavailability, and limited therapeutic efficacy. Nanocrystal-based drug delivery systems have emerged as a promising nanotechnology-based approach to overcome these limitations, particularly for poorly water-soluble drugs. Drug nanocrystals are crystalline particles generally ranging from the nanometer scale to a few hundred nanometers and consist predominantly of the active pharmaceutical ingredient stabilized by suitable surfactants or polymers. Reduction of drug particle size markedly increases the surface area, enhances dissolution rate, and can improve saturation solubility and oral bioavailability. Nanocrystals can be prepared by top-down methods, such as high-pressure homogenization and wet media milling, or bottom-up methods, including antisolvent precipitation and controlled crystallization. Various stabilizers are employed to prevent particle aggregation and maintain physical stability. Nanocrystal formulations can be incorporated into different dosage forms, including oral suspensions, tablets, capsules, topical gels, ophthalmic preparations, and parenteral formulations. Important characterization parameters include particle size, polydispersity index, zeta potential, drug content, saturation solubility, dissolution behavior, crystallinity, and morphological characteristics. Despite their advantages, challenges such as aggregation, crystal growth, physical instability, scale-up, and formulation stability need to be carefully

ISSN: 2584-2781

addressed. Overall, nanocrystal-based drug delivery represents a versatile and promising strategy for improving the dissolution, bioavailability, and therapeutic performance of poorly soluble drugs and has considerable potential in the development of next-generation pharmaceutical formulations.

Keyword:- *Drug Nanocrystals; Poorly Soluble Drugs; Enhanced Dissolution; Bioavailability; Nanotechnology-Based Drug Delivery*

INADDP/PT/OF/64-P

LIPID-BASED NANOPARTICLES AS A POTENTIAL DELIVERY APPROACH IN THE TREATMENT OF RHEUMATOID ARTHRITIS

*Naina Pathak**, Dr. Shradhanjali Singh*, Dr. Anil Kumar Singh
United institute of pharmacy, UCER A-31/1, UPSIDC Industrial area, Naini, Prayagraj - 211010
Email- *nainapathak9565@gmail.com*

Abstract:

Rheumatoid arthritis (RA) is a chronic autoimmune and inflammatory disease that primarily affects the joints, leading to synovial inflammation, cartilage destruction, bone erosion, joint deformity, and physical disability. Although several therapeutic approaches, including nonsteroidal anti-inflammatory drugs (NSAIDs), corticosteroids, disease-modifying antirheumatic drugs (DMARDs), biological agents, and natural compounds, are available for RA management, their effectiveness may be limited by poor drug absorption, rapid metabolism, systemic toxicity, frequent administration, and other adverse effects. Therefore, lipid-based nanoparticles have emerged as a promising approach for improving the delivery and therapeutic efficacy of anti-rheumatic drugs. The potential application of different lipid-based nanocarriers, including liposomes, niosomes, ethosomes, transfersomes, solid lipid nanoparticles (SLNs), nanostructured lipid carriers (NLCs), and lipid nanoemulsions, in the treatment of RA. These nanocarriers are generally composed of biocompatible and biodegradable lipids and can encapsulate therapeutic agents, protect them from degradation, and improve their delivery to inflamed tissues. Lipid-based nanoparticles may enhance the selective accumulation of drugs at arthritic joints through passive or active targeting strategies and can also provide controlled drug release, thereby reduce systemic exposure and improving therapeutic outcomes. The composition and surface characteristics of these nanoparticles can be modified to achieve tissue-specific targeting and ligand-controlled drug delivery. In addition, lipid-based nanosystems may be useful for developing targeted theranostic approaches for RA. Overall, lipid-based nanoparticles represent a promising drug delivery platform that can improve drug localization, therapeutic efficacy, and

ISSN: 2584-2781

safety compared with conventional free-drug administration. However, further research is required to optimize these systems and establish their clinical applicability in RA treatment.

Keywords: *Rheumatoid arthritis, lipid nanoparticle, liposomes, drug delivery, lipid nanoemulsion, SLN.*

INADDP/PT/OF/65-P

FLOATING MICROSPHERES AS A PLATFORM FOR GASTRORETENTIVE HERBAL THERAPEUTICS: FORMULATION PERSPECTIVES

Dolly Tripathi1, Richa Srivastava1*,

1.Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow- 226028
***Email Id**: rsrivastava1@lko.amity.edu*

Abstract:

Herbal therapeutics have become integral to modern pharmaceutical research owing to their diverse pharmacological activities, therapeutic potential, and abundance of bioactive phytoconstituents. However, clinical translation of many herbal drugs remains limited due to poor aqueous solubility, low bioavailability, rapid gastrointestinal transit, instability under physiological conditions, and extensive first-pass metabolism. Gastroretentive drug delivery systems (GRDDS) offer a promising solution by prolonging gastric residence time and enabling controlled drug release. Among these, floating microspheres have attracted significant attention for their multi-particulate nature, low density, prolonged buoyancy, and capacity to enhance drug absorption.

Floating microspheres are hollow or porous systems that remain buoyant in gastric fluids without altering gastric emptying. Incorporation of herbal extracts or purified phytoconstituents into these carriers enables sustained release, maintenance of therapeutic concentrations, and protection of labile constituents from degradation. Natural and synthetic polymers such as alginate, chitosan, ethyl cellulose, and other biodegradable materials are widely employed in their fabrication. Critical formulation parameters include particle size, density, polymer concentration, entrapment efficiency, buoyancy, surface morphology, and drug-release kinetics to govern their performance. These systems can reduce dosing frequency, improve therapeutic efficacy, minimize plasma concentration fluctuations, and enhance patient compliance.

Despite these advantages, challenges persist, including variability in herbal raw materials, phytoconstituent standardization, reproducibility, scale-up feasibility, stability concerns, and regulatory hurdles. Addressing these limitations is essential for successful clinical translation. In conclusion, the integration of herbal therapeutics with floating microsphere technology represents a novel and patient-friendly gastroretentive strategy. Future

ISSN: 2584-2781

pharmacokinetic, pharmacodynamic, and clinical investigations are warranted to establish their potential as effective platforms in modern drug delivery.

Keywords: *Gastroretentive drug delivery systems (GRDDS), Floating microspheres, Herbal therapeutics, Controlled drug release, Polymeric carriers*

INADDP/PT/OF/66-P

NANOTECHNOLOGY-BASED BRAIN-TARGETED DRUG DELIVERY FOR NEURODEGENERATIVE DISEASES: RECENT ADVANCES AND FUTURE PERSPECTIVES.

*Priyanka Vishwakarma1** (Author), Niharika Srivastava1, Nibha Singh1
1Kashi Institute of Pharmacy, Mirzamurad, Varanasi- 221307 (U.P)

Abstract:

Neurodegenerative diseases, including Alzheimer's disease, Parkinson's disease, Huntington's disease, and amyotrophic lateral sclerosis, represent a major therapeutic challenge due to progressive neuronal damage and limited effectiveness of conventional drug delivery approaches. One of the major barriers to successful treatment is the blood–brain barrier (BBB), which restricts the transport of many therapeutic agents into the brain. Nanotechnology-based drug delivery systems have emerged as promising strategies to overcome these limitations by improving drug solubility, stability, bioavailability, and targeted delivery to the central nervous system. Nanocarriers such as liposomes, polymeric nanoparticles, solid lipid nanoparticles, nanostructured lipid carriers, dendrimers, and nano emulsions can be engineered for brain-targeted delivery through receptor-mediated transport, surface modification, or intranasal administration. These systems may enable controlled and sustained release of therapeutic agents while reducing systemic toxicity. Recent advances also include multifunctional nanoparticles capable of responding to pathological stimuli such as pH, reactive oxygen species, enzymes, and temperature, as well as systems designed for specific cellular or organelle targeting. This review highlights recent developments in nanotechnology-based brain-targeted drug delivery for neurodegenerative diseases, focusing on major nanocarriers, BBB-crossing strategies, therapeutic applications, advantages, current challenges, and future perspectives. Overall, nanotechnology offers a promising platform for improving the delivery and therapeutic potential of drugs against neurodegenerative disorders. Moreover, nanotechnology can improve the delivery of therapeutic agents by enhancing their stability, protecting them from premature degradation, and facilitating their accumulation at the desired site of action. Such targeted approaches may help

ISSN: 2584-2781

minimize off-target effects and improve patient outcomes. Continued research in this field may support the development of innovative and safer therapeutic strategies for neurodegenerative disorders.

Keywords: *Nanotechnology, Brain-targeted drug delivery, Blood–brain barrier, Neurodegenerative diseases, Nanoparticles, Liposomes, Alzheimer's disease, Parkinson's disease*

INADDP/PT/OF/67-P

REDEFINING THE PHARMACEUTICAL PIPELINE THROUGH ARTIFICIAL INTELLIGENCE

Ms. Saloni Jaiswal
Department of Pharmacy, Jagannath University, Jaipur, 303901, Rajasthan, India.
Email:
saloni.jaiswal@jagannathuniversity.org

Abstract:

Conventional drug discovery and development is a complex, costly, and time-intensive process, with a substantial proportion of promising candidates failing during preclinical and clinical evaluation. The emergence of Artificial Intelligence (AI) is providing new opportunities to transform this traditional pharmaceutical workflow into a more predictive and data-driven process. The present review explores the application of AI technologies, including machine learning, deep learning, and natural language processing, across major stages of the pharmaceutical pipeline, encompassing target identification and validation, virtual screening, molecular design, lead optimization, drug–target interaction prediction, toxicity assessment, pharmacokinetic and pharmacodynamic prediction, formulation development, and clinical trial optimization. AI algorithms can integrate and analyze large-scale chemical, biological, genomic, pharmacological, and clinical datasets to identify meaningful patterns, prioritize potential drug candidates, and predict important drug characteristics before extensive experimental investigation. In clinical research, AI-assisted approaches can facilitate patient recruitment and stratification, biomarker identification, treatment-response prediction, trial monitoring, and analysis of complex clinical datasets. Nevertheless, several challenges, including data quality, algorithmic bias, model transparency, reproducibility, validation, ethical considerations, intellectual property, and regulatory acceptance, need to be addressed for reliable implementation. Overall, AI is emerging as a powerful tool for reshaping pharmaceutical research by connecting computational prediction with experimental and clinical investigation. Its responsible integration with pharmacology, medicinal chemistry, pharmaceutical sciences, and biomedical research may facilitate the development of safer,more effective, personalized, and economically viable therapeutic

ISSN: 2584-2781

interventions, ultimately contributing to a more efficient and patient-centered pharmaceutical development pipeline.

Keywords: *Artificial Intelligence, Drug Discovery, Drug Development, Machine Learning, Deep Learning, Virtual Screening, Pharmacology, Precision Medicine, Pharmaceutical Research*

INADDP/PT/OF/68-P

NANOTECHNOLOGY-BASED APPROACHES FOR ENHANCED WOUND HEALING

Vishwajeet Maurya[1], Prateek Pandey[2]*
Department of pharmacology, Department of pharmacology United institute of pharmacy, Naini, Prayagraj 211010 India
Email-
ishwajeetmaurya7054@gmail.com

Abstract:

Wound healing is an important natural and complex biological process that enables the body to repair damaged skin and underlying tissues and restore their normal function. However, various factors such as infections, prolonged inflammation, and delayed tissue regeneration can interfere with the normal healing process and may result in slow or ineffective wound closure. Conventional wound management approaches may not always provide adequate treatment, particularly when controlled drug delivery, infection control, and tissue regeneration are required. In recent years, nanotechnology has emerged as a promising approach for improving wound care and enhancing the overall wound healing process. Nanotechnology-based systems, including nanoparticles, nanofibers, nanogels, and other nanomaterials, can be utilized for the effective delivery of therapeutic agents directly to the wound site. These systems may help in controlling infections, reducing excessive inflammation, and supporting tissue regeneration. In addition, nano-based delivery systems can provide controlled and sustained release of drugs, which may improve the effectiveness of treatment and maintain the therapeutic action at the wound site. The application of nanotechnology in wound management therefore provides an approach for addressing several limitations associated with conventional wound treatment. By combining targeted drug delivery, infection control, inflammation management, and support for tissue regeneration, nanotechnology-based approaches may contribute to faster and more effective wound healing. This poster highlights the role and potential benefits of nanotechnology-based approaches in wound healing, along with their future potential for improving wound management and therapeutic outcomes.

Keywords: *Nanotechnology; Wound Healing; Nanoparticles; Nanofibers; Nanogels; Drug Delivery; Tissue Regeneration*

ISSN: 2584-2781

INADDP/PT/OF/69-P

NEUROCOSMETICS IN PSYCHODERMATOLOGY: HARNESSING THE BRAIN– SKIN AXIS FOR NEXT-GENERATION PRECISION SKINCARE

Ayush Kumar1 and Sunita Thakur1*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India
Department of Pharmaceutics, Amity Institute of Pharmacy, Amity University Uttar Pradesh Lucknow Campus-226028
***Email id** : sthakur@lko.amity.edu*

Abstract:

Neurocosmetics represents an emerging frontier in psychodermatology that integrates neuroscience, dermatology, and cosmetic science to target the bidirectional communication between the brain and skin. The brain– skin axis is mediated through neuroendocrine, immune, and sensory pathways that influence skin homeostasis, barrier function, inflammation, pigmentation, aging, and perceived well-being. Psychological stress can activate the hypothalamic– pituitary– adrenal axis and sympathetic nervous system, promoting the release of cortisol, neuropeptides, and inflammatory mediators that may contribute to conditions such as acne, atopic dermatitis, psoriasis, and premature skin aging. Neurocosmetic formulations aim to modulate these pathways through bioactive ingredients that interact with cutaneous sensory receptors, neuropeptide signaling, and stress-responsive mechanisms. Advances in skin neuroscience, biomarker discovery, artificial intelligence, and personalized formulation strategies are enabling the development of precision skincare tailored to individual neurocutaneous profiles. Ingredients targeting transient receptor potential channels, endocannabinoid signaling, neuropeptides, and microbial– neural interactions offer promising opportunities for regulating sensory perception, inflammation, and barrier integrity. Furthermore, emerging technologies such as wearable biosensors and digital phenotyping may facilitate real-time assessment of stress and skin responses, supporting adaptive skincare interventions. Despite its potential, neurocosmetics requires rigorous clinical validation, standardized biomarkers, and clearer distinction between cosmetic claims and therapeutic outcomes. Future research should prioritize mechanistic studies and personalized approaches that integrate psychological, neurological, microbiome, and dermatological parameters. Harnessing the brain– skin axis could therefore transform conventional skincare into a more individualized, evidence-based strategy that addresses both visible skin health and the neuropsychological factors influencing cutaneous function.

Keywords: *Neurocosmetics;*

ISSN: 2584-2781

Psychodermatology; Brain– Skin Axis; Skin– Brain Communication; Neuroinflammation; Stress; Neuroendocrine Signaling; Personalized Dermatology; Skin Barrier.

INADDP/PT/OF/70-P

REWRITING THE mRNA DELIVERY MAP: ALBUMIN HITCHHIKING LIPID NANOPARTICLES FOR SAFER AND SMARTER NANOMEDICINE

Abdul Shadab[1], Usama Ahmad1, Reshu Tiwari[1]*
1Faculty of Pharmacy, Integral University, Lucknow-226026, India
***Email**: abshadab@student.iul.ac.in*

Abstract:

Lipid nanoparticles (LNPs) have revolutionized the administration of mRNA treatments, while their broader clinical usefulness remains hampered by considerable hepatic buildup, off-target exposure, and safety problems associated with systemic and repeated dosage. This research covers albumin-hitchhiking LNPs as an emerging biomimetic technique that uses endogenous serum albumin to reprogram nanoparticle biodistribution and increase tissue-selective delivery. By combining current mechanistic and preclinical findings, we show how albumin interaction might modify the nanoparticle–protein interface, diminish identification by hepatic clearance pathways, promote endothelial transport, and increase lymphatic trafficking into immune-relevant regions. Reported data suggest around 70–80% decrease in hepatic buildup and an increase in lymph node delivery of two to three times, while preserving good encapsulation and mRNA transfection efficacy. Albumin recruitment is further related with lower complement activation and attenuation of inflammatory and liver-injury responses, indicating greater systemic tolerability and possible benefits for repeat-dose therapy. The review further discusses the translational potential of albumin-hitchhiking LNPs for mRNA vaccination, in vivo gene modification, and chronic nucleic-acid therapeutics, offering opportunities to integrate endogenous carrier biology with rational nanocarrier engineering and AI-enabled formulation design. Collectively, albumin hitchhiking is a departure from traditional passive "stealth" strategies to a biologically integrated and biosteered nanodelivery, providing a promising paradigm for the development of mRNA treatments of the future with enhanced biodistribution, precision, and safety.

Keywords: *Albumin hitchhiking; Lipid nanoparticles; mRNA therapeutics; Biodistribution; Lymphatic delivery; Nanomedicine*

INADDP/PT/OF/71-P

FROM ADVANCED DRUG DISCOVERY TO TISSUE REGENERATION: INTEGRATING NANOTECHNOLOGY FOR NEXT

ISSN: 2584-2781

GENERATION PRECISION THERAPEUTICS

Shams Imam1, and Dr Reetu*2
1 Student, College of Pharmacy, Integral University, Lucknow
2 Associate Professor, College of Pharmacy, Integral University, Lucknow

Abstract:

Regenerative medicine increasingly demands therapies that overcome poor cell survival, inadequate vascularization, rapid degradation, uncontrolled release and the hostile microenvironment of injured tissue.Conventional discovery and formulation workflows largely treat therapeutic selection and nanomaterial engineering as separate processes, limiting translational success. Integrating advanced drug discovery with nanotechnology offers a route toward precision regenerative therapeutics, wherein candidate molecules, bioactive ions, growth factors or genetic material are identified and prioritized computationally, followed by rational design of nanocarrier composition, surface properties, scaffold architecture and release kinetics.Engineered platforms including polymeric and lipid nanoparticles, metallic and ceramic nanoparticles, electrospun nanofibrous scaffolds, bioactive glasses, hydrogels and nanocomposites can be tailored to mimic the extracellular matrix, deliver therapeutics in a controlled manner, modulate immune responses and guide stem cell differentiation across bone, cartilage, cardiac, neural and skin regeneration applications. A recent 2026 in vivo study of cerium phosphate-citric acid nanocomposites offers timely proof-of-concept for this integrated approach: the optimized Ce:0.5CA formulation demonstrated strong antioxidant activity, fibroblast compatibility and favourable safety in animal models, supporting its wound-healing potential. Building on such evidence, future platforms could move beyond empirical formulation toward AI- and data-guided discovery formulation validation loops that use biological, physicochemical and patient-specific data to predict candidates, optimize nanomaterial attributes and refine tissue-specific delivery. Such integration could enable multifunctional systems coordinating drug/growth-factor delivery, redox control, immune modulation and tissue regeneration positioning nanotechnology as an active bridge between drug discovery and next-generation regenerative therapeutics, while highlighting the need for systematic validation, scalability, and clinical translation

Keywords: *Nanomedicine, regenerative medicine, advanced drug discovery, nanomaterials, artificial intelligence, precision therapeutic*

INADDP/PT/OF/72-P

NEXT-GENERATION ACNE THERAPEUTICS: HARNESSING SNEDDS AS AN ADVANCED NANOTECHNOLOGY-ENABLED

ISSN: 2584-2781

DRUG DELIVERY PLATFORM

Adiba Anees1, Mohammad Javed Ansari1*, Swati Sharma2
[1]Faculty of Pharmacy, Integral University, Lucknow, India
2Faculty of Biosciences, Integral University, Lucknow, India
***Email**: adibaphm@student.iul.ac.in*

Abstract:

Acne vulgaris is a polyetiological inflammatory skin disease, which involves hyperkeratinization, hyperseborrhea, dysbiosis of microorganisms and inflammation of the skin follicles. Although there are now a number of topical and systemic treatments available, their ability to achieve therapeutic efficacy may be hindered by factors such as poor aqueous solubility, inadequate deposition of the drug at the target site, formulation instability, irritation, and poor patient adherence. The challenges have raised the need for developing advanced delivery systems to enhance the physicochemical and biopharmaceutical performance of anti-acne agents. Self-nanoemulsifying drug delivery systems (SNEDDS) have come up as a favorable nanotechnology-based platform to overcome these limitations. SNEDDS consist of a mixture of oil and surfactant and co-surfactant and spontaneously generate nanosized droplets when it comes in contact with an aqueous phase, thereby improving the solubilization of poorly water-soluble drugs and drug-skin interactions and increasing interfacial area of drug release. They are easy to formulate and suitable for incorporation of lipophilic therapeutics, making them attractive for topical delivery. Additionally, SNEDDS can be incorporated into an appropriate semisolid or hydrogel system, enhancing the residence time on the skin, spreadability, drug deposition, and patient acceptance. Therefore, SNEDDS can be considered as a new paradigm of drug delivery systems, in which acne therapy is brought into the era of formulation-based nanotechnology-based acne management. SNEDDS could also be a promising platform for next generation topical acne therapeutics due to rational formulation design, optimized cutaneous targeting, and combination therapy.

Keywords: *Acne vulgaris; self-nanoemulsifying drug delivery system (SNEDDS); nanotechnology; topical drug delivery; nano formulation; cutaneous drug delivery*

INADDP/PT/OF/73-P

POLYMERIC PARADIGMS IN FORMULATION DEVELOPMENT: BRIDGING MATERIAL SCIENCE AND THERAPEUTIC INNOVATION

Salvi Singh, Richa Srivastava
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow- 226028

ISSN: 2584-2781

Email Id: rsrivastava1@lko.amity.edu

Abstract:

Polymer science has become an important part of modern pharmaceutical formulation, particularly in advancing drug delivery technologies. Polymers such as Eudragit and alginate are widely studied for their ability to stabilize active pharmaceutical ingredients (APIs) and enable controlled release. For example, telmisartan encapsulated in Eudragit microspheres demonstrates pH-independent release, while alginate particles provide effective oral delivery platforms. These systems highlight how polymeric structures can be tailored to improve solubility, bioavailability, and therapeutic performance. Nanotechnology is now reshaping this field by introducing nanoscale carriers that overcome traditional barriers in drug delivery. Liposomes, polymeric nanoparticles, solid lipid nanoparticles, and nanogels allow precise targeting, sustained release, and improved pharmacokinetics. Nano-curcumin formulations, for instance, show superior anti-inflammatory and cardioprotective effects compared to crude extracts, while nano-silymarin enhances hepatoprotective activity. Similarly, poly(vinylpyrrolidone) nanogels improve bioavailability of therapeutic agents, and stimuli-responsive hydrogels adapt dynamically to physiological triggers such as pH or temperature, enabling "smart" drug release. Cyclodextrin-based supramolecular systems further enhance solubility and bioactivity of poorly soluble drugs, addressing a persistent challenge in formulation science. Beyond therapeutic efficacy, innovations in renewable polymeric materials are reducing the environmental footprint of pharmaceutical manufacturing, combining sustainability with performance. The convergence of polymer science, nanotechnology, and supramolecular chemistry has paved the way for integrative drug delivery strategies that are more precise, adaptable, and patient-centered. Hence, the future research will be more focussed on clinical translation, safety validation, and regulatory harmonization to fully realize the potential of nano-polymeric systems in cardiovascular, hepatic, and broader therapeutic applications.

Keywords: *Polymeric nanocarriers, Controlled drug release, Stimuli-responsive hydrogels, Supramolecular systems*

INADDP/PT/OF/74-P

SMART TRANSNIOSOMAL PLATFORMS IN CUTANEOUS MALIGNANCIES: INTEGRATING EDGE ACTIVATOR DYNAMICS FOR ENHANCED DERMAL PENETRATION

Vivek Yadav1, Abdul Hafeez1*, Javed Akhtar Ansari1

[1] *Faculty of Pharmacy, Integral University, Lucknow, India*

ISSN: 2584-2781

Email: *vivekydv@student.iul.ac.in*

Abstract:

Skin cancer therapy remains clinically limited by the stratum corneum's formidable barrier, which restricts the deep percutaneous penetration of conventional topical formulations and standard lipidic nanocarriers. To overcome these physiological limitations, edge activator (EA)-loaded nanovesicles have been introduced as a major innovation in localized transdermal drug delivery. Among these, the novel transniosomes represent a futuristic platform that combines the nonionic surfactant-based structural stability of conventional niosomes with the ultra-flexible, membrane-softening characteristics imparted by edge activators such as sodium cholate. The presence of EAs destabilizes the lipid bilayer leading to ultra-deformable vesicle architectures that can pass through narrow intercellular lipid pathways without affecting the structure. Experimental evidences show that transniosomes optimized by response surface usually range in nanometer size vesicles (74-149 nm) with optimal entrapment efficiencies and controlled percutaneous release kinetics. Advanced characterization by confocal laser scanning microscopy (CLSM) and dermatokinetic profiling shows a significantly higher dermal deposition than conventional hydrogels or rigid nanocarriers. In preclinical skin carcinogenesis models, transniosomal administration preserves the desired biocompatibility and safety profile while considerably delaying tumor initiation and reducing tumor volume and multiplicity. Transniosomes are leading the recent advances in nanomedicine, being a radical departure from the classical lipid carriers. In this review, we focus on the key formulation design factors, EA-driven permeation mechanisms and translational potential of transniosomes as safe, targeted and non-invasive nanotherapeutics for contemporary skin cancers.

Keywords: *Transniosomes, edge activator, ultra-deformable vesicle, percutaneous penetration*

INADDP/PT/OF/75-P

CHRONOCOSMETIC NANOTECHNOLOGY FOR CIRCADIAN RHYTHM-SYNCHRONIZED BLUE-LIGHT PROTECTION AND PREVENTION OF DIGITAL SKIN AGING

Anamta Khan, Dr. Mohammad Shariq*, Prof. Tariq Mehmood, Dr. Farogh, Dr. Reshu Tiwari
Faculty of Pharmacy, Integral University, Lucknow
Email: *khnanam@student.iul.ac.in*

Abstract:

The widespread and prolonged use of smartphones, computers and other digital devices has introduced continuous

ISSN: 2584-2781

exposure to artificial blue light, emerging as a potential contributor to oxidative stress, pigmentation, barrier dysfunction and premature skin aging. Conventional photoprotective approaches primarily focus on ultraviolet radiation and may not adequately address the combined effects of blue-light exposure and disruption of the skin's intrinsic circadian rhythm. The present review proposes a next-generation chronocosmetic strategy that integrates circadian biology, antioxidant protection and nanotechnology-based topical delivery for time-responsive management of digital skin stress. The role of the cutaneous circadian clock, involving core molecular regulators such as CLOCK, BMAL1, PER and CRY, is explored in relation to skin homeostasis, repair and oxidative defense. Bioactive compounds including melatonin, ferulic acid, niacinamide, vitamin C derivatives, lutein, astaxanthin and ectoin are discussed for their complementary antioxidant, barrier-supporting and photoprotective potential. Particular emphasis is placed on nanostructured lipid carriers (NLCs) as an advanced delivery platform capable of improving the stability, skin deposition and controlled release of selected bioactives, thereby providing an opportunity for chronobiologically synchronized topical therapy. A conceptual formulation framework is proposed in which antioxidant and circadian-active ingredients are strategically delivered according to the skin's temporal requirements. Integration of chronobiology with nanotechnology may therefore establish a personalized, preventive and time-responsive approach to blue-light-induced digital skin aging, representing a promising direction for next-generation pharmaceutical and cosmetic delivery systems.

Keywords: *Chronocosmetics, Circadian rhythm, Blue light, Digital skin aging, Nanotechnology, Nanostructured lipid carriers*

INADDP/PT/OF/76-P

NANOFORMULATIONS FOR ALZHEIMER'S DISEASE: OVERCOMING THE BLOOD–BRAIN BARRIER FOR TARGETED NEUROPROTECTION

Mayank Pal[1], Dr Ramesh Kr. Gupta[2]*
1Amity Institute of Pharmacy, Amity University, Lucknow, U.P., India-226028
Email Id: *mayank.pal1@s.amity.edu*

Abstract:

Alzheimer's disease (AD) is a multifactorial neurodegenerative disorder in which amyloid-β accumulation, tau pathology, neuroinflammation, oxidative stress, mitochondrial dysfunction, and synaptic failure interact to drive progressive neuronal loss and cognitive decline. A major limitation of current and emerging therapeutics is the inability to achieve adequate and sustained drug concentrations at the site of pathology because of poor physicochemical properties, systemic metabolism, efflux mechanisms, and the restrictive blood–

ISSN: 2584-2781

brain barrier (BBB). Thus, improving pharmacological activity alone may be insufficient without an effective strategy for brain delivery. Nanoformulation-based drug delivery offers a rational approach to this therapeutic gap. Nanocarriers can improve solubility, protect labile molecules from degradation, modulate pharmacokinetics, allow controlled release and enable brain targeting. In particular, nanostructured lipid carriers (NLCs) based drug delivery systems offer a versatile platform for encapsulation of poorly water-soluble neuroprotective agents, while providing surface engineering for improved cellular or BBB interaction. Intranasal delivery may also offer a valid nose-to-brain route via the olfactory and trigeminal routes, minimising the need for systemic BBB trafficking. Nanoformulations may enable the delivery of multifunctional agents that can simultaneously modulate oxidative stress, neuroinflammation, amyloid-related pathology, and mitochondrial dysfunction. Recent preclinical evidence supports enhanced brain exposure and therapeutic outcomes with targeted and intranasal nanocarrier systems. However, reproducibility, long-term safety, scale-up, targeting specificity and clinical translation remain major challenges. Therefore, rationally designed, multifunctional nanoformulations appear to be a promising approach to improve site-specific drug delivery and advance neuroprotective therapy in AD.

Keywords: *Alzheimer's disease; Nanoformulation; Blood–brain barrier; Nanostructured lipid carriers; Nose-to-brain delivery; Brain-targeted drug delivery.*

INADDP/PT/OF/77-P

NEXT-GENERATION NANOTECHNOLOGY IN DRUG DELIVERY: SMART SYSTEMS FOR PRECISION THERAPEUTICS

Kaustubh Shukla, Richa Srivastava
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow- 226028

Email Id: *rsrivastava1@lko.amity.edu*

Abstract:

Nanotechnology has emerged as a transformative force in pharmaceutical sciences, enabling the design of next-generation drug delivery systems that transcends the limitations of conventional formulations. Advanced nanocarriers which include polymeric nanoparticles, nanogels, dendrimers, and lipid-based nanostructures offer unprecedented control over drug solubility, stability, and release kinetics. Central to this innovation is the integration of stimuli-responsive "smart" materials, engineered to respond to physiological cues such as pH, enzymatic activity, and redox gradients, or external triggers including light, ultrasound, and magnetic fields. These dynamic systems facilitate site-specific targeting, enhance bioavailability, and minimize systemic

ISSN: 2584-2781

toxicity, thereby advancing the paradigm of precision medicine. Beyond therapeutic delivery, nanotechnology is redefining oral, injectable, and implantable platforms through hybrid designs that combine bioadhesive polymers, 3D-printed scaffolds, and surface-functionalized nanocarriers. Such systems enable prolonged retention at target sites, improved patient compliance, and effective treatment of complex conditions including cancer, neurodegenerative disorders, and infectious diseases. Despite remarkable progress, translation into clinical practice remains challenged by scalability, regulatory hurdles, and long-term biosafety concerns. Addressing these requires interdisciplinary collaboration among chemists, engineers, clinicians, and regulatory bodies. Ultimately, next-generation nanotechnology in drug delivery represents a pivotal frontier in biomedical innovation, offering versatile solutions that bridge molecular design with clinical application. Its evolution promises to reshape therapeutic landscapes, positioning nanomedicine as a cornerstone of future healthcare.

***Keywords**: Nanocarriers, Stimuli-responsive systems, Precision therapeutics, Bioavailability enhancement, Smart drug delivery*

INADDP/PT/OF/78-P

NANOTECHNOLOGY IN LIVER CANCER THERAPY: A PATH TOWARD SMARTER DRUG DELIVERY

Ishita Pal, Richa Srivastava
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow- 226028
***Email**: rsrivastava1@lko.amity.edu*

Abstract:

Liver cancer, especially hepatocellular carcinoma (HCC), continues to be one of the most difficult cancers to treat due to late detection, complex biology, and limited success with conventional therapies. Traditional chemotherapy often struggles with poor drug solubility, rapid clearance, and severe side effects, leaving patients with few effective options. Nanotechnology is opening new doors by designing tiny carriers—such as liposomes, polymeric nanoparticles, dendrimers, and metallic nanostructures—that can transport drugs directly to tumor sites with greater precision. These nanosystems improve

drug stability, enhance bioavailability, and allow controlled release, reducing harm to healthy tissues. Passive targeting through the enhanced permeability and retention (EPR) effect, combined with active targeting using ligands that recognize tumor-specific receptors, ensures that therapy reaches the liver cancer cells more effectively. Smart nanocarriers can even respond to local signals like pH changes or enzymes, releasing drugs only when and where they are needed. Beyond treatment,

ISSN: 2584-2781

theranostic nanoparticles combine therapy with imaging, enabling doctors to track how well the drugs are working in real time. Emerging approaches, including RNA-based nanocarriers, gene-editing tools, and immune-modulating nanoparticles, promise to personalize therapy and strengthen the body's own defences against cancer. With the integration of article intelligence, this evolving field may transform liver cancer therapy into a more precise and personalized journey.

Keywords: *Nanotechnology, Drug delivery systems, Hepatocellular carcinoma, Targeted therapy, Theranostics*

INADDP/PT/OF/79-P

NOVEL FUCOIDAN: FROM MARINE SOURCES TO THERAPEUTIC FRONTIERS

Tinkal1, Vishakha Jaiswal*1
1Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow, India 226028
Email ID: *tinkal@s.amity.edu*

Abstract:

Fucoidan, a sulphated, L-fucose-rich heteropolysaccharide isolated from the cell walls of brown macroalgae (Phaeophyceae) such as Fucus vesiculosus, Sargassum spp., Laminaria japonica, and Undaria pinnatifida, has emerged as one of the most versatile marine biopolymers in contemporary pharmaceutical science. Its backbone of α-(1→3)- and α-(1→4)-linked fucopyranose units, variably substituted with sulphated esters and accessory sugars (galactose, mannose, xylose, glucuronic acid), gives rise to pronounced structural heterogeneity across species, extraction methods, and harvest conditions. This heterogeneity underlies a well-documented structure–activity relationship in which molecular weight, degree and position of sulfation, and branching pattern govern bioactivity: highly sulphated fractions favor anticoagulant, antiviral, and anti-inflammatory effects, while low-molecular-weight fractions show enhanced bioavailability, antioxidant capacity, and anticancer efficacy. Mechanistically, fucoidan modulates different signalling to exert antioxidant, anti-inflammatory, immunomodulatory, anticoagulant, antiviral, antidiabetic, cardioprotective, and pro-apoptotic/antiangiogenic anticancer activities, the latter substantiated across cell-line, animal, and early clinical studies. Beyond its intrinsic bioactivity, fucoidan's anionic sulphate groups enable facile polyelectrolyte complexation with chitosan, proteins, PLGA, and metallic nanoparticles, supporting the design of fucospheres, nanoparticles, liposomes, micelles, and nanogels for controlled and P-selectin-targeted delivery of chemotherapeutics (doxorubicin, cisplatin, methotrexate, curcumin), with demonstrated tumour-selective accumulation and reduced off-target toxicity in preclinical oncology models. Despite this promise, translation is constrained by structural variability,

ISSN: 2584-2781

extraction/purification inconsistencies, limited oral bioavailability, and a paucity of large, standardized clinical trials.

Keywords: *Fucoidan; marine polysaccharides; nanomedicine; drug delivery; anticancer*

INADDP/PT/OF/80-P

SMART NANOSTRUCTURES FOR PROLONGED GASTRIC RETENTION AND CONTROLLED RELEASE

Mohil Mishra1, Richa Srivastava1
**Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow226028*
***Email Id**: rsrivastava1@lko.amity.edu*

Abstract:

Gastroretentive drug delivery systems (GRDDS) have gained considerable interest as an approach to improve the oral delivery of drugs whose therapeutic performance may benefit from prolonged gastric residence, enhanced dissolution, or sustained exposure at the absorption site. However, conventional gastroretentive systems may exhibit variable performance due to gastric motility, gastric emptying, physiological differences, and changes between fed and fasted states. The integration of nanostructural drug delivery approaches with gastroretentive technologies offers an opportunity to address these limitations while improving the physicochemical and biopharmaceutical performance of poorly water-soluble drugs. Selfmicroemulsifying drug delivery systems (SMEDDS), owing to their ability to generate fine oilin-water dispersions upon aqueous dilution, represent a promising nanoscale platform for enhancing drug solubilisation, dispersion, and dissolution following oral administration. Combining the self-emulsification characteristics of SMEDDS with gastroretentive strategies may provide a multifunctional platform capable of improving gastric residence while maintaining favourable drug release characteristics. Such an integrated approach may facilitate enhanced interaction with the gastric environment, sustained drug availability, and improved oral drug delivery. The present work explores the conceptual development of a smart SMEDDS-based gastroretentive platform designed to integrate nanoscale self-emulsification with prolonged gastric retention and controlled drug release. The approach emphasizes rational formulation design and systematic evaluation of key performance attributes governing selfemulsification, drug loading, physicochemical characteristics, gastric retention, and release behaviour. Integration of nanotechnology with gastroretentive principles may provide a versatile strategy for overcoming solubility- and absorption-related limitations while potentially improving therapeutic exposure. Nevertheless, challenges related to formulation stability, reproducible gastric retention, gastrointestinal physiological variability, scale-up, safety, and regulatory translation remain important

ISSN: 2584-2781

considerations. Overall, the integration of SMEDDS with smart gastroretentive nanostructures represents a promising strategy for developing advanced oral drug delivery systems with improved solubilisation, prolonged gastric residence, and controlled drug release.

Keywords: *Gastroretentive drug delivery systems; SMEDDS; smart nanostructures; gastric retention; self-micro emulsification; controlled drug release; oral drug delivery; poorly soluble drugs.*

INADDP/PT/OF/81-P

POLYMERIC MICROPARTICLES FOR PULMONARY DRUG DELIVERY

Aaddya Mishra[1], Dr Ramesh Kumar Gupta *[2]

[1]*Amity Institute of Pharmacy, Amity University, Lucknow Campus, Uttar Pradesh 226028, India*

Email ID: *aaddyam445@gmail.com , rkgupta@lko.amity.edu*

Abstract:

Pulmonary drug delivery is a rapidly growing advancement in targeted therapeutics; however, conventional inhalation systems are constrained by major physiological limitations including rapid mucociliary clearance, enzymatic degradation, poor deep-lung deposition, and systemic side effects. Polymeric microparticle (MPs) engineering is revolutionising next-generation respiratory medicine by overcoming these basic barriers. Optimised to a respirable aerodynamic size (1–5 μm) polymeric microparticles can deposit efficiently deep in the lungs in the terminal bronchioles and alveolar spaces, while avoiding premature upper-airway impaction. Higher particle engineering, such as large porous microparticles (LPMs), further decreases alveolar macrophage phagocytosis, resulting in a dramatic increase in local pulmonary retention from hours to days. Polymeric nanocarriers enhance cellular uptake, cross mucosal barriers and enable localised intracellular delivery at the same time. The combination of biodegradable and biocompatible polymer matrices like Poly(lactic-co-glycolic acid) (PLGA) with functional mucoadhesive polymers such as Hyaluronic Acid provides precise, sustained and controlled drug release kinetics. This localised depot mechanism provides stable therapeutic drug levels at the target site, greatly reducing systemic toxicity, minimising dosing frequency, and improving overall patient adherence. Furthermore, these smart polymeric platforms are susceptible to hydrophobic small molecules, biologics, and specific therapies, thus offering tailored treatment methods for complicated chronic lung diseases such as Asthma, Chronic Obstructive Pulmonary Disease (COPD), and Idiopathic Pulmonary Fibrosis (IPF). To summarise, advanced polymeric microparticles and nanoparticles are critical next-generation drug discovery and delivery platforms bridging the gap

ISSN: 2584-2781

between innovative nanomedicine and translational pulmonary therapeutics.

Keywords: *Polymeric Microparticles; Pulmonary Drug Delivery System; PLGA; Hyaluronic Acid; Targeted Therapeutics; Controlled Release*

INADDP/PT/OF/82-P

DEVELOPMENT AND CHARACTERIZATION OF A NOVEL OMEPRAZOLE-LOADED CHITOSAN-COATED NANOEMULGEL WITH POTENTIAL ANTIMICROBIAL ACTIVITY: IN VITRO AND EX VIVO EVALUATION

Janhvi Pal[1], Singh Shekhar Gautam[2]*
Department of Pharmaceutics, Department of pharmaceutics United Institute of Pharmacy, Naini, Prayagraj 211010 India

Abstract:

The development of novel nanocarrier-based topical formulations has gained considerable attention for improving drug delivery and enhancing therapeutic efficacy. The present study focuses on the formulation and evaluation of an omeprazole-loaded chitosan-coated nanoemulgel intended to explore its potential antimicrobial activity. Omeprazole was incorporated into a nanoemulsion system comprising suitable oil, surfactant, and co-surfactant components, followed by surface coating with chitosan and incorporation into a suitable gel base. The developed formulation is proposed to provide improved drug solubilization, enhanced physicochemical stability, and prolonged contact with the biological surface. The formulation will be characterized for particle size, polydispersity index, zeta potential, entrapment efficiency, pH, viscosity, spreadability, morphological characteristics, and drug content. In-vitro drug-release studies will be performed to evaluate the release behavior of omeprazole from the developed nanoemulgel. The antimicrobial potential will be assessed against selected microbial strains using appropriate microbiological methods. Furthermore, ex-vivo permeation studies using suitable biological tissue will be conducted to investigate drug permeation and retention characteristics. The chitosan coating is expected to enhance surface interaction and residence time, thereby potentially improving the therapeutic performance of the formulation. Overall, the proposed omeprazole-loaded chitosan- coated nanoemulgel may represent a promising nanotechnology-based approach for topical drug delivery and warrants further investigation for its potential antimicrobial applications.

Keywords*: Omeprazole, Chitosan, Nanoemulgel, Nanocarrier, Antimicrobial activity, In- vitro evaluation, Ex-vivo permeation*

INADDP/PT/OF/83-P

ROLE OF NANOPARTICLES IN

ISSN: 2584-2781

COMBAT ANTIBACTERIAL RESISTANCE: CURRENT PROGRESS, MECHANISMS, AND FUTURE PERSPECTIVES

Rahul Ojha1 and Ms.Chandani Nigam1*

1: Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India
Dept. of Pharmacology, Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India.
E-mail: cnigam@lko.amity.edu ; chandaninigam995@gmail.com

Abstract:

Antibacterial resistance has emerged as a major global health challenge, reducing the effectiveness of conventional antibiotics and increasing the difficulty of treating multidrugresistant (MDR) bacterial infections. The continuous development of resistance through mechanisms such as enzymatic antibiotic degradation, target-site modification, reduced membrane permeability, biofilm formation, and active drug efflux highlights the need for alternative and complementary therapeutic strategies. Nanoparticles (NPs) have gained considerable attention as promising tools for combating antibacterial resistance because of their unique physicochemical properties, high surface area, and ability to interact with multiple bacterial targets. Metallic, metal oxide, polymeric, lipid-based, carbon-based, and silica nanoparticles can exhibit direct antibacterial activity or act as carriers for conventional antibiotics. Their antibacterial effects involve disruption of bacterial cell membranes, generation of reactive oxygen species (ROS), release of metal ions, interference with cellular enzymes, damage to DNA and proteins, inhibition of biofilm formation, and modulation of efflux-pump activity. Furthermore, nanoparticle-based drug delivery can improve antibiotic stability, cellular uptake, targeted delivery, and therapeutic efficacy while potentially reducing the required antibiotic dose. Recent advances in surface-functionalized, biomimetic, stimuli-responsive, and antibiotic-loaded nanoparticles have further improved their potential against MDR pathogens. However, challenges related to cytotoxicity, biocompatibility, formulation stability, large-scale production, environmental effects, resistance to nanoparticles, and regulatory approval remain. Future research should focus on developing safe, targeted, sustainable, and clinically translatable nanotherapeutics. Overall, nanoparticles represent a promising multifunctional approach for strengthening existing antibacterial therapies and addressing the growing threat of antibacterial resistance.

Keywords: *Nanoparticles; Antibacterial resistance; Multidrug-resistant bacteria; Nanotechnology; Reactive oxygen species; Biofilm; Targeted drug delivery; Antibiotic resistance; Nanotherapeutics.*

ISSN: 2584-2781

INADDP/PT/OF/84-P

TRANSFEROSOMES: A NOVEL NANOTECHNOLOGY-BASED APPROACH FOR ENHANCE TRANSDERMAL DRUG DELIVERY

*Shalinee Yadav**
1Department of Pharmaceutics, United Institute of Pharmacy, Prayagraj
***Email**- yshalinee322@gmail.com*

Abstract:

Transdermal drug delivery is a promising non-invasive approach that can improve patient compliance, provide controlled drug release, and avoid gastrointestinal degradation and hepatic first-pass metabolism. However, the stratum corneum acts as a major barrier, restricting the permeation of many therapeutic agents.Transferosomes have emerged as advanced lipid-based nanocarriers capable of addressing this limitation through their ultra-deformable vesicular structure. Transferosomes primarily consist of phospholipids and edge activators, which impart flexibility and deformability to the vesicular membrane. Their ability to undergo reversible deformation facilitates movement through narrow pathways within the skin, while hydration gradients contribute to transdermal transport.These systems can encapsulate both hydrophilic and lipophilic drugs and have demonstrated potential for delivering small molecules as well as larger therapeutic agents, including peptides and proteinsThis review focuses on the composition, mechanism of skin permeation, preparation techniques, characterization parameters, therapeutic applications, and recent advancements in transferosomal drug delivery. Key evaluation parameters include vesicle size, polydispersity index, zeta potential, entrapment efficiency, deformability, drug release, skin permeation, and stability.

***Keywords**: Transferosomes; Nanotechnology; Transdermal Drug Delivery; Ultra-deformable Vesicles; Skin Permeation; Lipid Nanocarriers.*

INADDP/PT/OF/85-P

IN SILICO-DRIVEN FORMULATION OPTIMIZATION: MACHINE LEARNING FRAMEWORKS FOR HIGH-CONCENTRATION MONOCLONAL ANTIBODY (MAB) BIOSIMILARS

Jalesh Kahsyap[1], Neeraj Jain*
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow-226028, India
***Email**- jalesh.kashyap@s.amity.edu*

Abstract:

The creation of liquid formulations for monoclonal antibody (mAb) biosimilarsis a difficult and resource-intensive procedure that is hampered by original product patent issues, physical instability, and high-concentration viscosity. Development delays are caused by the

ISSN: 2584-2781

large protein amounts and lengthy stability testing cycles needed for traditional empirical screening and statistical Design of Experiments (DoE). In order to speed up formulation design for mAb biosimilars, this study suggests an integrated in silico methodology that combines automated high-throughput biophysical profiling with machine learning (ML) and Bayesian active learning. The method quantifies surface charge asymmetry, spatial aggregation propensity, and colloidal self-interaction characteristics by combining molecular dynamics simulations, structural embeddings, and sequence-based descriptors. Critical stability indices such as melting temperature, aggregation start, and dynamic viscosity are predicted using multi-objective surrogate models based on Gaussian Processes and Graph Neural Networks throughout a wide design space of excipients, buffers, and pH levels. The closed-loop platform repeatedly directs microliter-scale automated experiments by utilizing active learning acquisition functions, which updates predicted uncertainty and reduces the necessary experimental search area by more than 70% when compared to conventional DoE. In order to guaranty bio-equivalency with reference products without violating originator formulation patents, candidate formulations are then put through accelerated thermal and mechanical stress testing, high-resolution size-exclusion chromatography (SE-UPLC), and capillary isoelectric focusing (cIEF). In the end, this computational workflow reduces protein consumption, de-risks early-stage formulation, and creates a repeatable, data-driven paradigm for creating high-concentration, patent-unrestricted biosimilar treatments.

Keywords: *Biosimilar Pharmaceuticals, Monoclonal Antibodies, Formulation Optimization, Machine Learning, Protein Aggregation & Colloidal Stability, High-Concentration Biotherapeutics*

Pharmacognosy & allied branches

ISSN: 2584-2781

INADDP/PT/OF/01

ENRICHMENT OF GYMNEMIC ACIDS FROM *GYMNEMA SYLVESTRE* LEAVES AND EVALUATION OF VAXORELAXANT ACTIVITY

Abhishek Yadav[1], Debabrata Chanda[2], Prasant Kumar Rout[1],
[1]*Phytochemistry Division, CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow 226015, Uttar Pradesh, India*
[2]*Bio-prospection and Product Division, CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow 226015, Uttar Pradesh, India*
Email Id: *abhishek.cimap25a@acsir.res.in*

Abstract:

Gymnema sylvestre (Retz.) R.Br. is a well-known antidiabetic plant rich in gymnemic acids (GAs). Dried leaves were extracted using a hydro-ethanolic (7:3) solvent system to obtain a crude extract (Gym-Crude). The crude extract was acidified to pH 3 using 10% HCl to obtain an enriched gymnemic acid fraction. The enriched extract was subjected to sequential alkaline and acidic hydrolysis using KOH in methanol 20% by weight and H_2SO_4 10% by weight in methanol respectively. The resulting mixture was purified by flash chromatography over silica gel (230–400 mesh) using a $CHCl_3$–MeOH gradient containing 1% formic acid, with gradually increasing polarity, to isolate Gymnemagenin. The Gymnema enriched extract (300 µg/mL) exhibited 47.73 ± 3.23% relaxation in the mesenteric artery and 25.74 ± 6.0% relaxation in the aorta. In comparison, the isolated gymnemagenin (30 µM) showed a pronounced vasorelaxant effect, producing 59.44 ± 1.88% relaxation in the mesenteric artery and 61.62 ± 2.12% relaxation in the aorta. These findings indicated that both the Gymnema enriched extract and gymnemagenin possess vasorelaxant activity, with gymnemagenin showing comparatively higher activity.

Key words**:** *Gymnemic acid, Enriched extract, Gymnemagenin, Vasorelaxation*

INADDP/PY/ON/02

PLANT-BASED STRATEGIES FOR KIDNEY DISEASE MANAGEMENT: MECHANISTIC EVALUATION OF ZEA MAYS STIGMA AND CITRULLUS LANATUS SEED EXTRACTS

Ansari M Mohsin, Arti Gupta
Amity Institute of Pharmacy, Amity

ISSN: 2584-2781

University Maharashtra
Email: *ansarimdmohsin28196@gmail.com*

Abstract:

In the case of diabetes and complications thereof, cardiovascular diseases, kidney disease, which is of public health significance, has been attributed to factors such as oxidative stress, inflammation, mitochondrial disorders, apoptosis, and structural injury to renal tissue. There is a growing interest in exploring plant sources of bioactive compounds as a possible supplement to reduce the injury to the kidney and improve renal function. Citrus lanatus (Thunb.) and Zea mays L. stigma (corn silk) Matsum and Nakai seed extracts have been used for many years in different medical systems.
The mechanistic potential of Citrullus lanatus seed extracts and Zea mays stigma for the treatment of kidney disease is assessed in this study. Reduction of pro-inflammatory mediators, restoration of natural antioxidant enzymes, suppression of lipid peroxidation, attenuation of reactive oxygen species formation, and maintenance of renal-cell membrane integrity are some of the suggested renoprotective effects. Serum creatinine, blood urea nitrogen, uric acid, and electrolyte balance are examples of renal functional parameters that may be improved by these treatments, which may ultimately lessen glomerular and tubular damage. The extracts from corn-silks might act as protective agents against drug-induced nephrotoxicity using antioxidant, detoxification, anti-inflammatory, and stabilization mechanisms in experimental studies. Besides, the seeds of Citrullus lanatus may exhibit their antioxidant potential, providing a protective effect against experimental kidney injuries. With several pathways in mind, such plant components can be considered complementary when used together. Nevertheless, most studies conducted at present are preclinical, and clinical application is limited by differences in the method of extracts' preparation, dosage, phytochemistry, disease model, and endpoints used. It seems necessary that future research would include the standardized extract characterization, dose-effect studies, pharmacokinetics, renal histopathology, biomarkers of oxidative stress and inflammation, and properly designed clinical trials.

Keywords: *Zea mays stigma; Citrullus lanatus seeds; Nephroprotection; Oxidative stress; kidney disease management*

ISSN: 2584-2781

INADDP/PY/OF/31

NANOTECHNOLOGY-ENABLED HERBAL THERAPEUTICS: ARJUNA AND AMLA IN CARDIOVASCULAR DISEASE MANAGEMENT

Vaibhav Kumar, Richa Srivastava
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow- 226028
***Email Id**: rsrivastava1@lko.amity.edu*

Abstract:

Cardiovascular diseases (CVDs) remain the leading cause of global mortality, driven by oxidative stress, inflammation, and endothelial dysfunction. Herbal drugs such as *Terminalia arjuna* (Arjuna) and *Emblica officinalis* (Amla) have long been valued in traditional medicine for their cardioprotective properties. Arjuna is rich in triterpenoids and flavonoids that strengthen cardiac muscle, improve coronary circulation, and reduce angina, while Amla provides potent antioxidant and lipid-lowering effects through its high vitamin C and polyphenolic content. Conventional herbal formulations face limitations which include poor solubility, low bioavailability, and inconsistent absorption, hence, restricting their clinical translation in biological system. Modern nanotechnology offers innovative solutions to overcome these barriers. Nanocarriers such as liposomes, polymeric nanoparticles, and solid lipid nanoparticles enhance the delivery, stability, and controlled release of Arjuna and Amla phytoconstituents. Nano-Arjuna formulations having chitosan and PLGA (poly-lactic-co-glycolic acid) nanoparticles have demonstrated improved myocardial protection, reduced ischemic injury, and enhanced endothelial function compared to crude extracts. Similarly, nano-amla systems like Polymeric nanoparticle, Solid lipid nanoparticles (SLNs) and Nano emulsions exhibit superior antioxidant activity, better regulation of lipid profiles, and attenuation of oxidative stress in cardiovascular tissues. These nano-herbal interventions not only improve therapeutic efficacy but also minimize herb–drug interactions and variability in absorption.The integration of Arjuna and Amla into nanotechnology-based delivery systems represents a promising paradigm in cardiovascular therapeutics. Therefore, by bridging traditional herbal wisdom with modern nanomedicine, these approaches can provide safer, more effective, and targeted interventions for CVD management. Future research must emphasize rigorous clinical validation, safety profiling, and regulatory harmonization to translate these

ISSN: 2584-2781

nano-herbal systems into mainstream cardiovascular care.

***Key Words*:** *Arjuna, Amla, Nanotechnology, Cardiovascular diseases, Nanocarriers*

INADDP/PY/OF/04

ROLE OF DEXAMETHASONE IN TESTICULAR TOXICITY AND POTENTIAL PHYTOCONSTITUENTS-BASED PROTECTION

Atul Yadav[1], Prashant Lawaniya1, Pragati Rathore1, Anurag Tiwari1, Priyanka Prajapati1*

[1]*Krishna Institute of Pharmacy and Sciences, Amiliha, Tatiyaganj, Kanpur-209217*

Email id: *dr.priyanka243prajapati@mail.com*

Abstract:

Dexamethasone (DEX), a potent synthetic glucocorticoid, has been associated with adverse effects on male reproductive function, particularly following prolonged or repeated exposure. Experimental studies indicate that DEX can disturb the hypothalamic–pituitary–testicular axis and suppress Leydig-cell steroidogenesis, resulting in reduced testosterone production. DEX exposure has also been reported to impair sperm count, motility and morphology, accompanied by degeneration of seminiferous tubules and alterations in Leydig-cell integrity. A major mechanism underlying DEX-induced testicular toxicity is oxidative stress. DEX increases lipid peroxidation, reflected by elevated malondialdehyde (MDA), while reducing endogenous antioxidant defenses such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and reduced glutathione (GSH). It may additionally promote apoptotic signaling, including increased caspase activity and reduced anti-apoptotic Bcl-2 expression, ultimately compromising spermatogenesis and testicular architecture. Several naturally occurring phytoconstituents and plant-derived preparations have demonstrated protective effects against DEX-associated reproductive toxicity. Kolaviron, a bioflavonoid-rich fraction from Garcinia kola, significantly improved DEX-induced reductions in sperm quality and testosterone while restoring SOD, CAT and GPx and reducing MDA. Grape-seed extract, rich in polyphenolic antioxidants, also attenuated DEX-induced oxidative stress, testosterone depletion and histological testicular damage. Ginseng and propolis have similarly demonstrated protective effects against DEX-induced oxidative and reproductive disturbances.

ISSN: 2584-2781

Quercetin is another promising phytoconstituents because published evidence supports its antioxidant, anti-inflammatory, anti-apoptotic and testicular-protective activities. Thus, DEX-induced testicular toxicity provides a relevant experimental model for investigating antioxidant phytoconstituents such as kolaviron, quercetin, ginsenosides and polyphenolic compounds as potential agents for preventing glucocorticoid-associated male reproductive dysfunction.

Keywords: *Dexamethasone, Testicular toxicity, Male infertility, Oxidative stress, Spermatogenesis, Testosterone.*

INADDP/PY/OF/05

PHYTOCHEMICAL CHARACTERIZATION AND EVALUATION OF THE ANTI-INFLAMMATORY AND ANTIOXIDANT POTENTIAL OF AZADIRACHTA INDICA LEAF EXTRACT

*Balvant Singh1**
Department of Pharmaceutical Chemistry, Invertis University, Bareilly, Uttar Pradesh, India
Email id: *balvant.singh20.bs@gmail.com*

Abstract:

Azadirachta indica (Neem) is a traditionally important medicinal plant containing diverse bioactive phytoconstituents that may contribute to its pharmacological properties. The presence of phenolic compounds, flavonoids, terpenoids, alkaloids and other secondary metabolites makes A. indica a promising candidate for the investigation of antioxidant and anti-inflammatory activities.The present study was undertaken to characterize the major phytochemical constituents of A. indica leaf extract and to evaluate its antioxidant and anti-inflammatory potential. Leaves of A. indica were collected, authenticated, processed and subjected to extraction using a hydroalcoholic solvent system. Preliminary phytochemical screening was performed to identify the major classes of secondary metabolites present in the extract. Antioxidant potential was evaluated using an appropriate radical-scavenging assay. The anti-inflammatory activity was investigated by an in vivo carrageenan-induced paw edema model in rats. Diclofenac sodium was used as the standard anti-inflammatory drug. Changes in paw volume and percentage inhibition of edema were assessed following treatment. Preliminary phytochemical screening revealed the presence of flavonoids, phenolic compounds, alkaloids, terpenoids, tannins, saponins, steroids, glycosides and carbohydrates. The extract demonstrated concentration-dependent antioxidant activity. In the carrageenan-induced paw

ISSN: 2584-2781

edema model, A. indica leaf extract produced dose-dependent inhibition of paw edema, with the higher dose showing greater anti-inflammatory activity. The observed activity was compared with that of diclofenac sodium. The findings indicate that Azadirachta indica leaf extract possesses promising antioxidant and anti-inflammatory potential, which may be associated with its diverse phytochemical constituents. The study supports further phytochemical characterization and mechanistic investigation of its bioactive constituents for potential therapeutic applications.

Keywords: *Azadirachta indica; Phytochemical characterization; Antioxidant activity; Anti-inflammatory activity; Carrageenan-induced paw edema; Neem*

INADDP/PY/OF/06

ENHANCING THERAPEUTIC POTENTIAL OF PHYTOCHEMICALS THROUGH NANOSTRUCTURE LIPID CARRIER-BASED DELIVERY

*Dhvani Rafaliya**1, Aditya Singh 2
**1Department of Pharmaceutical Technology, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Limda, Waghodia, Vadodara,391760, Gujarat, India*
Email Id: *judani.maza@gmail.com*

Abstract:

The therapeutic potential for phytochemicals is enormous because of their anti-inflammatory, antioxidant, antimicrobial, and anticancer activities, but this is difficult because of their low aqueous solubility, low bioavailability, degradation, and lack of targeting in tissues. To overcome these limitations, a new class of nanocarriers was developed, the nanostructure lipid carriers (NLCs), which are lipid-based and are able to render phytochemicals more effective medicinal agents. This review discusses the possibilities of NLC-based delivery systems to enhance bioavailability, stability, solubility, controlled release, and targeted release of bioactive phytochemicals. The drug-loading capability and protection of phytochemicals against chemical and enzymatic degradation are achieved with NLCs, which are made up of a mixture of solid and liquid lipids and are stabilized with appropriate surfactants. The tunability of cell-specific targeting of nanoscale size and their surface properties could enable better cellular penetration and targeting. In recent years, new NLC formulations with phytochemicals such as curcumin, quercetin, resveratrol, and berberine show

ISSN: 2584-2781

better pharmacological activity than conventional formulations. In addition, optimizing the lipid composition, particle size, surface properties, and release of the particles could enhance therapeutic outcome. While NLC-based delivery is a very promising method to see the translation of phytochemical therapeutics to effective and clinically relevant uses, there remain several challenges to be overcome such as scale-up, long-term stability, toxicity and regulatory standardization.

Keywords: *Phytochemicals; Nanostructured Lipid Carriers; Nanotechnology; Bioavailability; Targeted Delivery; Controlled Release.*

INADDP/PY/OF/07

THERAPEUTIC POTENTIAL OF CLERODENDRUM COLEBROOKIANUM WALP. LEAF EXTRACT IN TNBS-INDUCED COLITIS: EVIDENCE FROM DISEASE ACTIVITY, HEMATOLOGICAL AND HISTOPATHOLOGICAL OUTCOMES

Diptimayee Jena1, Manish Kumar Gautam1, Kirtimaya Mishra2

1Faculty of Pharmaceutical Sciences, Assam down town University, Guwahati, Assam

2School of Pharmacy & Life Sciences, Centurion University of Technology & Management, Bhubaneswar, Odisha

***Email id**: diptimayee.pharma@gmail.com*

Abstract:

Diarrhoea, abdominal pain, blood in the stool, weight loss, and nutritional problems are some of the clinical signs of ulcerative colitis, a recurring inflammatory disease of the large intestine. Pharmacologists have shown keen interest in Clerodendrum colebrookianum Walp., a conventional herbal medicine, due to its varied phytochemical content. The current study investigated the pharmacological efficacy of Clerodendron colebrookianum leaves extract (CCE) on colitis. Leaves of C. colebrookianum were collected, authenticated, and subjected to extraction through an ethanolic maceration technique resulting in 12.7% yield of the extract. The presence of alkaloids, tannins, saponins, phenols, sugars, steroids, flavonoids, terpenoids, glycosides, and phytosterols was determined in the plant after preliminary phytochemical analysis. After determination of the safety of the extracts, anti-colitic study was carried out on TNBS-induced colitis. Six sets of animal groups (n=6) were created: normal control group,

ISSN: 2584-2781

disease control group, & CCE 100, 200, and 400 mg/kg groups. For 14 days, treatments were given orally once a day. The Disease Activity Index (DAI), faecal blood, stool consistency, food and drink consumption, and changes in body weight were all used to track the progression of the illness. Hematological indicators and histological changes in colonic tissue were also evaluated. Significant illness symptoms, such as increased DAI, decreased body weight and food intake, increased water intake, hematological changes, and widespread mucosal ulcers with epithelial breakdown, were brought on by TNBS treatment. These alterations were lessened by CCE therapy, with the 200 mg/kg dose showing the strongest response. DAI dropped by 58.0% on Day 7, from 2.78 in the TNBS disease-control group to 1.17 with CCE 200 mg/kg. DAI dropped to 0.11 by Day 14, which is 96.1% less than the TNBS disease-control group. By Day 14, CCE 200 mg/kg also increased food intake from 9.6 g to 23.6 g and restored body weight from 198 g to 243 g in the disease-control group. Hematological results demonstrated improvement, including recovery of hemoglobin from 10.4 to 12.0 g/dL and a decrease in WBC count from 12.8 $\times 10^3/\mu L$ in the disease-control group to 9.2 $\times 10^3/\mu L$ with CCE 200 mg/kg. Following CCE 200 mg/kg treatment, histopathological analysis showed decreased ulceration and inflammatory damage as well as enhanced mucosal integrity. The results conclude that C. colebrookianum leaf extract has important therapeutic and preventive potential against experimental colitis caused by TNBS. CCE 200 mg/kg demonstrated a significant decrease in disease activity and the most consistent improvement in clinical, hematological, and histological outcomes among the assessed dosages. These initial results encourage more research on C. colebrookianum as a possible natural product candidate for inflammatory bowel illness. Further studies on TNF-α, IL-23, and associated molecular mechanisms could assist in understanding the pharmacological pathways.

Keywords: *Ulcerative colitis, Inflammatory disease, Clinical assessment, Experimental colitis, Disease Activity Index (DAI), Faecal blood, Stool consistency, Food and drink consumption.*

INADDP/PY/OF/08

FROM PHYTOCHEMICAL DISCOVERY TO NANO-THERAPEUTICS: EXPLORING MICHELIA CHAMPACA LINN. FOR NEXT-GENERATION BURN WOUND HEALING

Muskan Kushwaha

ISSN: 2584-2781

Krishna Institute of Pharmacy and Sciences, Tatiyaganj, Kanpur
Mail id: *muskankushwaha183@gmail.com*

Abstract:

Burn injuries are associated with oxidative stress, persistent inflammation, microbial invasion, impaired re-epithelialization and delayed tissue regeneration, creating a need for multifunctional and localized therapeutic strategies. Michelia champaca Linn. (Magnoliaceae) is a medicinal plant containing diverse bioactive phytoconstituents with reported antioxidant, anti-inflammatory and antimicrobial properties. Although burn-wound healing activity has been reported for M. champaca flowers, the therapeutic potential of its leaves remains comparatively underexplored, providing a rationale for their systematic investigation. The present study explores M. champaca leaves as a potential phytotherapeutic lead for burn wound management and proposes a translational pathway from phytochemical discovery to nano-enabled therapy. Hydroalcoholic leaf extract is subjected to physicochemical and preliminary phytochemical evaluation, followed by assessment of relevant biological activities and in-vivo burn-wound healing parameters. Promising phytochemical fractions/constituents may subsequently be prioritized as therapeutic leads using chromatographic profiling and activity-guided evaluation. To address limitations of conventional topical herbal delivery, including instability, poor aqueous solubility and limited retention at the wound site, integration with nanotechnology-based delivery platforms is proposed. Polymeric nanoparticles, lipid-based nanocarriers or nanohydrogels could facilitate localized, sustained and controlled delivery while potentially improving phytochemical stability and bioavailability. The proposed phytochemical-to-nanotherapeutic strategy integrates natural-product drug discovery with advanced drug-delivery technology and may provide a rational platform for multifunctional burn therapy targeting oxidative stress, inflammation, microbial burden and tissue regeneration. This approach could contribute to the development of standardized, scalable and next-generation plant-derived therapeutics for burn wound management.

Keywords: *Michelia champaca; burn wound; phytochemical discovery; nanotechnology; nano-therapeutics; drug delivery; wound regeneration.*

INADDP/PY/OF/09

PROBIOTIC-FERMENTED PLANT BIO-ACTIVES AND THEIR NANO-FORMULATION: A NOVEL APPROACH FOR DIABETES

ISSN: 2584-2781

MANAGEMENT

Neelam Maurya1, Shanti Bhushan Mishra*
Department of pharmacology, Department of pharmacognosy
United Institute of pharmacy, Naini, Prayagraj 211010 India
Email ID: neelammaurya1209@gmail.com

Abstract:

Diabetes mellitus is a major metabolic disorder that is increasing worldwide and is associated with high blood glucose levels, oxidative stress, and several long-term complications. Plant bioactive compounds such as phenolics, flavonoids, and other antioxidants have shown promising antidiabetic properties. However, their effectiveness can be limited by poor stability, solubility, and bioavailability. Probiotic fermentation is an emerging approach that may improve the availability and biological activity of plant bioactive compounds through microbial transformation. Furthermore, nanotechnology can be used to formulate these bio-actives into nanosized delivery systems, potentially improving their stability, absorption, and therapeutic performance. The combination of probiotic fermentation with nanotechnology may provide a novel strategy for enhancing the therapeutic potential of natural bio-actives in diabetes management. Fermented bio-actives loaded into nanoparticles could potentially improve glucose regulation, reduce oxidative stress, and support better metabolic health. This approach represents an emerging link between *probiotics, natural-product chemistry, and nanomedicine*. Further in-vitro, animal, and clinical studies are needed to establish their safety, effectiveness, and practical application in diabetes management.

Keywords: *Diabetes mellitus, probiotic fermentation, Nanotechnology, bioactive, oxidative stress, Bioavailability.*

INADDP/PY/OF/10

PHYTOCONSTITUENTS-BASED THERAPEUTIC APPROACHES AGAINST RESERPINE-INDUCED FIBROMYALGIA: FOCUS ON OXIDATIVE STRESS AND NEUROINFLAMMATION

Prashant Lawaniya1, Atul Yadav1, Pragati Rathore1, Anurag Tiwari1, Priyanka Prajapati1*
1Krishna Institute of Pharmacy and Sciences, Amiliha, Tatiyaganj, Kanpur-209217
Email id: *dr.priyanka243prajapati@mail.com*

ISSN: 2584-2781

Abstract:

Fibromyalgia is a chronic disorder characterized by widespread musculoskeletal pain, fatigue, sleep disturbances, and cognitive dysfunction, with oxidative stress, neuroinflammation, and altered pain processing contributing to its pathophysiology. Reserpine-induced fibromyalgia-like pain is an established preclinical approach for evaluating analgesic and antinociceptive agents, as reserpine-induced depletion of monoamines, particularly serotonin, norepinephrine, and dopamine, can produce widespread pain sensitivity, muscular tenderness, fatigue-like behaviour, and altered nociceptive processing. This model therefore provides a useful platform for investigating potential therapeutic agents against fibromyalgia-like symptoms. Several naturally occurring phytoconstituents have demonstrated pharmacological activities relevant to these mechanisms. Quercetin, curcumin, resveratrol, naringenin, catechin, epigallocatechin gallate (EGCG), and kaempferol have been reported to possess antioxidant, anti-inflammatory, analgesic, and neuroprotective properties. These phytoconstituents may attenuate oxidative stress, suppress pro-inflammatory mediators such as TNF-α, IL-1β, and IL-6, and modulate signaling pathways involved in nociception and neuronal dysfunction. In particular, flavonoids such as quercetin and kaempferol and phenolic compounds such as curcumin and resveratrol have shown potential in reducing oxidative and inflammatory damage associated with chronic pain conditions. Therefore, evaluation of selected phytoconstituents in reserpine-induced fibromyalgia-like pain may provide valuable insight into their protective effects on musculoskeletal and neurological dysfunction. Further studies investigating behavioural, biochemical, inflammatory, and histopathological parameters may help establish their therapeutic potential and underlying mechanisms.

Keywords: *Fibromyalgia, Reserpine, Musculoskeletal pain, Oxidative stress, Neuroinflammation, Phytoconstituents, Quercetin*

INADDP/PY/OF/11

Natural Antioxidant Phytochemicals Genistein and Diosgenin: Mechanistic Insights and Therapeutic Prospect

Salman Abdul Mobin1, Poonam Pavan Nikam*2

Amity Institute of Pharmacy, Amity University Maharashtra

ISSN: 2584-2781

Mail id : *sal313man@gmail.com*

Abstract:

The natural plant-derived compounds known as genistein and diosgenin have gained much attention due to their promising properties as disease modifying, anti-inflammatory, and antioxidative agents. Diosgenin, a steroid sapogenin found in plants such as Dioscorea and Trigonella foenum-graecum, and genistein, an isoflavone isolated from soy, can affect a number of pathways associated with various diseases mediated through oxidative stress. Oxidative stress can be involved in the pathogenesis of diseases because of the overproduction of reactive oxygen species, lipid peroxidation, mitochondrial dysfunction, DNA damage, and improper regulation of inflammation. With its ability to modulate the antioxidant defense system such as glutathione, catalase, superoxide dismutase, as well as other redox-sensitive pathways, genistein has been found to reduce oxidative stress. Moreover, there is evidence that nuclear factor erythroid 2-related factor 2, nuclear factor-kappa B, mitogen-activated protein kinase, proteins involved in apoptosis, and estrogen-receptor associated signalling pathways are all regulated by it. There is also considerable potential for diosgenin as an antioxidant and cytoprotectant because it is able to reduce reactive oxygen species generation, improve mitochondrial function, decrease inflammation, as well as alter lipid metabolism. For animal and clinical models of diabetic pathologies, cardiovascular pathologies, neurodegenerative diseases, cancers, hepatic toxicity, and inflammation, both compounds show promising preclinical activity. Both are promising candidates for further nutraceutical and pharmaceutical development based on their multi-target pharmacological activity. Nevertheless, a direct translation of preclinical observations to clinical practice is hindered by differences in dose, bioavailability, metabolism, experimental models, and quality of clinical investigations. The main directions of future investigations should include formulation standardization, pharmacokinetic profiling, safety assessment, mechanism-oriented biomarker development, and properly designed clinical studies.

Keywords: *Genistein; Diosgenin; Oxidative stress; Antioxidants; Therapeutic potential*

INADDP/PY/OF/12

EVALUATION OF THE HEPATOPROTECTIVE AND ANTIOXIDANT POTENTIAL OF BAUHINIA VARIEGATE FLOWER

ISSN: 2584-2781

EXTRACT AGAINST EXPERIMENTALLY INDUCED HEPATOTOXICITY

Satish Kumar Kushwaha [1], Dr Virendra Kumar Maurya[2]*, Mr Kamlesh Kumar[3]

[1]Department of Pharmacology, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India

[2] Department of Pharmaceutical Chemistry, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India

[3]Department of Pharmacognosy, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India

Email id: *judani.maza@gmail.com*

Abstract:

Hepatotoxicity is a major health concern characterized by hepatic injury, oxidative stress, and impairment of normal liver function. Bauhinia variegata is a medicinal plant traditionally recognized for its diverse pharmacological properties and the presence of bioactive phytoconstituents with potential antioxidant activity. The present study was undertaken to evaluate the hepatoprotective and antioxidant potential of Bauhinia variegata flower extract against experimentally induced hepatotoxicity. Authenticated flowers of B. variegata were collected, dried, powdered, and extracted using a suitable extraction procedure. Preliminary phytochemical screening was performed to identify the major classes of phytoconstituents present in the extract. The antioxidant potential was evaluated using appropriate in-vitro antioxidant assays, while hepatoprotective activity was assessed in an experimental model of hepatotoxicity by evaluating liver function parameters, oxidative stress markers, and other relevant biochemical parameters. The extract showed the presence of several important phytochemical constituents and demonstrated appreciable antioxidant activity. Treatment with the flower extract exhibited a protective effect against experimentally induced hepatic injury, as indicated by improvement in relevant biochemical parameters compared with the toxicant control group. The observed hepatoprotective effect may be associated with the antioxidant properties of the extract and its ability to attenuate oxidative damage in hepatic tissue. The findings suggest that B variegata flower extract possesses promising hepatoprotective and antioxidant potential and warrants further investigation as a possible natural source of hepatoprotective agents.

Keywords: *Bauhinia variegata, Hepatoprotective, Antioxidant,*

ISSN: 2584-2781

Hepatotoxicity, Oxidative stress, Phytochemicals

INADDP/PT/OF/13

EVALUATION OF THE CARDIOPROTECTIVE AND ANTIOXIDANT POTENTIAL OF *NYCTANTHES ARBOR-TRISTIS* LEAF EXTRACT AGAINST EXPERIMENTALLY INDUCED MYOCARDIAL INJURY

Shabihul Hasan[1], Dr Virendra Kumar Maurya[2]*, Mr Kamlesh Kumar[3]

[1] *Department of Pharmacology, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

[2] *Department of Pharmaceutical Chemistry, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

[3] *Department of Pharmacognosy, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

Email Id: judani.maza@gmail.com

Abstract:

Myocardial injury is a major cardiovascular complication associated with oxidative stress, cellular damage, and impairment of normal cardiac function. *Nyctanthes arbor-tristis* is a medicinal plant traditionally recognized for its diverse pharmacological properties and the presence of bioactive phytoconstituents with potential antioxidant and cardioprotective effects. The present study was undertaken to evaluate the cardioprotective and antioxidant potential of *Nyctanthes arbor-tristis* leaf extract against experimentally induced myocardial injury. Authenticated leaves of *N. arbor-tristis* were collected, dried, powdered, and extracted using a suitable extraction procedure. Preliminary phytochemical screening was performed to identify major classes of phytoconstituents present in the extract. The antioxidant potential was evaluated using appropriate in-vitro antioxidant assays, while cardioprotective activity was assessed in an experimental model of myocardial injury by evaluating relevant cardiac biomarkers, biochemical parameters, and oxidative stress markers. The extract showed the presence of several important phytochemical constituents and demonstrated appreciable antioxidant activity. Treatment with the leaf extract exhibited a protective effect against experimentally induced myocardial injury, as indicated by improvement in relevant biochemical

ISSN: 2584-2781

parameters compared with the injury control group. The observed cardioprotective effect may be associated with the antioxidant properties of the extract and its ability to attenuate oxidative damage in cardiac tissue. The findings suggest that *N. arbor-tristis* leaf extract possesses promising cardioprotective and antioxidant potential and warrants further investigation as a natural source of bioactive compounds for cardiovascular protection.

Keywords**:** *Nyctanthes arbor-tristis, Cardioprotective, Antioxidant, Myocardial injury, Oxidative stress, Phytochemicals.*

INADDP/PY/OF/14

NOVEL GALLIC ACID DERIVATIVES AS NEXT-GENERATION THERAPEUTICS: AN INTEGRATED APPROACH USING ADVANCED DRAG DISCOVERY AND NANOTECHNOLOGY

*Shubham Patel**
Department of pharmaceutical chemistry, United Institute of pharmacy, Prayagraj
Email-
shubhampatel7007690641@gmail.com

Abstract:

Gallic acid is a naturally occurring polyphenolic compound with promising antioxidant, anti-inflammatory, antimicrobial, and other therapeutic properties. However, its clinical application may be limited by factors such as poor stability and bioavailability. The development of novel gallic acid derivatives offers an effective strategy to improve its pharmacological and physicochemical properties. Advanced drug discovery approaches, including rational molecular design, in silico screening, synthesis, and biological evaluation, can be used to identify promising therapeutic candidates. Furthermore, the incorporation of these derivatives into nanotechnology-based drug delivery systems may enhance their stability, bioavailability, targeted delivery, and therapeutic efficacy. Therefore, the integration of advanced drug discovery platforms with nanotechnology represents a promising approach for the development of novel gallic acid derivatives as next-generation therapeutics.

Keywords: *Gallic acid, Novel derivatives, Drug discovery, Nanotechnology, In silico studies, Therapeutics*

INADDP/PY/OF/15

RE-ENGINEERING BERBERINE DELIVERY THROUGH A MUCOADHESIVE BUCCAL FILM: A

ISSN: 2584-2781

PATIENT-CENTRIC PLATFORM FOR ENHANCED SYSTEMIC ANTIDIABETIC THERAPY

Shubhendu Om Prakash Dash1, Himanshu Bansode2
Department of Pharmaceutics, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara
***Email**: shubhendudash7@gmail.com*

Abstract:

Berberine has emerged as a promising natural therapeutic candidate for metabolic disorders, yet its translation into effective systemic therapy is constrained by limited oral bioavailability and extensive presystemic disposition. Rather than pursuing conventional oral administration, the present work explores buccal mucosal delivery as a strategic route to improve drug utilization while providing a convenient, non-invasive dosage form. A mucoadhesive buccal film of berberine hydrochloride is being engineered using a complementary polymeric matrix comprising chitosan, HPMC E15 and sodium carboxymethyl cellulose, with PEG 400, Tween 80 and mannitol incorporated to optimize film flexibility, wetting and handling characteristics. The formulation strategy is designed to establish intimate and prolonged contact with the buccal mucosa, thereby supporting controlled drug release and facilitating systemic absorption. The developed films will be characterized for appearance, thickness, weight variation, folding endurance, surface pH, drug content, moisture characteristics, mucoadhesive performance and in-vitro release behavior, followed by selection of an optimized formulation based on critical quality attributes. Permeation and pharmacodynamic assessment may further establish its potential for systemic antidiabetic delivery. The significance of this approach lies in converting berberine from a bioavailability-limited oral phytoconstituent into a rationally engineered, patient-centric delivery system. By combining natural-product therapeutics with advanced mucoadhesive formulation science, this work proposes a practical next-generation platform with potential to enhance berberine exposure, therapeutic consistency and acceptability in diabetes management.

Keywords: *Berberine, Buccal drug delivery, Mucoadhesive film, Bioavailability enhancement, Antidiabetic therapy, Advanced drug delivery*

ISSN: 2584-2781

INADDP/PY/ON/16

FROM NATURE TO NANOMEDICINE: HARNESSING NANOTECHNOLOGY FOR NEXT-GENERATION HERBAL DRUG DELIVERY

*Sonali Vishwakarma**

Email Id: *sv886030@gmail.com*

Herbal medicines represent a valuable source of biologically active compounds with diverse therapeutic potential; however, their clinical effectiveness can often be limited by poor aqueous solubility, instability, low bioavailability and difficulties in achieving controlled delivery. Nanotechnology provides an emerging platform to address these limitations by enabling the incorporation of herbal bioactive compounds into advanced nanoscale delivery systems.

Nanocarriers can offer improved solubility, enhanced bioavailability, protection of bioactive constituents, controlled release and more effective delivery to intended sites of action. This review explores the evolving interface between herbal therapeutics and nanotechnology, focusing on emerging nano-enabled delivery approaches for improving the therapeutic performance of plant-derived bioactive compounds. Particular emphasis is placed on the role of nanoparticulate systems, nanoemulsions and other advanced nanocarriers in overcoming key formulation and delivery barriers. The review also highlights important challenges associated with formulation stability, reproducibility, scale-up, safety assessment, regulatory considerations and translation from laboratory development to clinical application. Integrating nanotechnology with herbal medicine may provide a promising pathway for transforming naturally derived therapeutic agents into more effective and patient-oriented formulations. Future research directed towards rational nanocarrier design, comprehensive safety evaluation and clinically relevant development could further strengthen the potential of nano-enabled herbal therapeutics as an important component of next-generation drug delivery.

Keywords: Nanotechnology, Herbal therapeutics, Nanocarriers, Bioavailability, Advanced drug delivery, Nanomedicine

INADDP/PY/OF/17

STIMULI-RESPONSIVE PHYTOCHEMICAL NANOMEDICINE: A REVIEW ON THE SYNCHRONIZED CO-DELIVERY OF ENDOPEROXIDES

ISSN: 2584-2781

AND CURCUMIN TO OVERCOME APOPTOTIC RESISTANCE IN TNBC

1 *Bachlors of Pharmacy Student, Era College of Pharmacy, Era University, Lucknow*
**1 Head Of Department, Department of Pharmaceutics, Era College Of Pharmacy , Era University, Lucknow*
**2Head Of Department, Department of Pharmacognosy and Phytochemistry , Era College Of Pharmacy , Era University, Lucknow*
**3Head Of Department, Department of Pharmacology, Era College Of Pharmacy , Era University, Lucknow*
***Email**: architakhilcollege@gmail.com*

Abstract:

Triple-negative breast cancer (TNBC) is a highly aggressive malignancy characterized by frequent multidrug resistance due to absence of targeted therapeutic receptors (ER, PR and HER). While traditional plant-derived chemotherapies (such as vinca alkaloids) are utilized clinically, they primarily rely on apoptosis which is a cell death pathway. The aggressive TNBC cells frequently mutates to evade that pathway. Plant-derived endoperoxides, specifically artemisinin and ascaridole, offer a potent alternative by triggering ferroptosis, an iron-dependent, oxidative form of cell death. However, their clinical translation is severely hindered by critical pharmacokinetic bottlenecks: artemisinin suffers from a rapid physiological clearance, ascaridole faces targeted-delivery challenges, and their efficacy is often blunted when TNBC cells adaptively upregulate the NF-κB survival and antioxidant pathway. To bridge these isolated pharmacological challenges and bypass traditional apoptotic resistance this review proposes a novel conceptual framework of a tripartite, stimuli-responsive nanocarrier system. This system is tailored to synchronize the co-delivery of artemisinin, ascaridole, and curcumin into TNBC cells by utilizing glutathione (GSH)-responsive disulfide linkers. Crucially, this system coordinates a synchronized intracellular assault. Upon tumor-specific GSH cleavage, the endoperoxides are released to exploit TNBC's inherently high intracellular iron, pushing the cells past their redox threshold into lethal ferroptosis. Simultaneously, curcumin is deployed to systematically dismantle the tumor's hyperactive NF-κB-mediated defense grid. By integrating phytochemical pharmacology, ferroptosis biology, and responsive nanotechnology, this nano-encapsulation strategy simultaneously resolves curcumin's near-zero aqueous solubility, artemisinin's rapid

ISSN: 2584-2781

clearance, and ascaridole's delivery limitations, while exploiting the elevated intracellular GSH levels characteristic of the TNBC microenvironment.

Keywords: *Artimisinin, Ascaridol, Curcumin, Encoperonxide Linkage, TNBC, stimuli responsive drug delivery systems.*

INADDP/PT/OF/18

MECHANISTIC EVALUATION OF A STANDARDIZED BIOACTIVE FRACTION OF *SIDERITIS BILGERIANA* IN EXPERIMENTAL INFLAMMATION: INTERPLAY BETWEEN NRF2/HO-1 AND NF-KB SIGNALING

Surya Prakash[1], Dr Virendra Kumar Maurya[2]*, Mr Kamlesh Kumar[3]

[1] *Department of Pharmacology, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

[2] *Department of Pharmaceutical Chemistry, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

[3] *Department of Pharmacognosy, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*

Email Id: *judani.maza@gmail.com*

Abstract:

Inflammation is a complex biological response involving oxidative stress and activation of intracellular signaling pathways, particularly nuclear factor kappa B (NF-κB) and nuclear factor erythroid 2-related factor 2/heme oxygenase-1 (Nrf2/HO-1). *Sideritis bilgeriana* is a medicinal plant containing bioactive phytoconstituents with potential antioxidant and anti-inflammatory properties. The present study was undertaken to evaluate the anti-inflammatory and antioxidant potential of a standardized bioactive fraction of *Sideritis bilgeriana* and investigate its possible mechanistic interaction between the Nrf2/HO-1 and NF-κB signaling pathways in experimental inflammation. The plant material was collected, authenticated, and processed to obtain a standardized bioactive fraction using a suitable extraction and fractionation procedure. Phytochemical characterization was performed to assess the major bioactive constituents. Antioxidant activity was evaluated using appropriate in-vitro assays, while anti-inflammatory efficacy was investigated in an experimental model of inflammation by assessing paw edema, biochemical parameters, and oxidative

ISSN: 2584-2781

stress markers. The mechanistic role of Nrf2/HO-1 and NF-κB signaling was evaluated using appropriate molecular or biochemical markers. The bioactive fraction demonstrated appreciable antioxidant activity and produced a reduction in inflammation-associated paw edema and biochemical alterations. The observed effects may be associated with enhancement of the Nrf2/HO-1 antioxidant pathway and suppression of NF-κB-mediated inflammatory signaling. These findings suggest that the standardized bioactive fraction of *S. bilgeriana* possesses promising antioxidant and anti-inflammatory potential and may provide a mechanistically relevant natural therapeutic approach for inflammatory disorders.

***Keywords*:** *Sideritis bilgeriana, Anti-inflammatory, Antioxidant, Nrf2/HO-1, NF-κB, Inflammation.*

INADDP/PY/OF/19:

CANCER EPIGENETICS EFFECT OF CURRY LEAF CARBAZOLE ALKALOIDS

Swati Singh [a,b], Kapil Kumara, Divya Vermaa, Barsha Thapaa, Debabrata Chandaa,b , Arvind Singh Negia,b
A Phytochemistry Division, CSIR-Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP), Lucknow-226 015, U.P., India
B Academy of Scientific and Innovative Research (AcSIR), Kamla Nehru Nagar, Ghaziabad, Uttar Pradesh 201 002
Email: *drswatisingh9450@gmail.com*

Abstract:

Cancer has become a giant major type of health issue imparting a key public health threat to mankind. Cancer is a prominent source of decease worldwide, accountable for approximately 10 million deceases in 2024, or nearly one in six deaths [WHO, Cancer: Keyfacts, 03 July 2026]. Previously, cancer was considered as genetic disorder but now it is well recognized that substantial epigenetic dysfunctions are also relevant influences in cancer commencement and progression. Plants have extremely subsidised in cancer drug manufacturing. Thus, substantial amendments as epigenetic interference have become a symbol of cancer. Histone deacetylase (HDAC) enzymes are generally consulted in case of several types of cancer and precisely HDAC6 is complicated in epigenetic phases of cancer. [Khwaja et al. 2024]. Some HDAC6 inhibitors have been permitted for clinical application. Selectivity and specificity are two significant aspects while designing HDAC6 inhibitors and execute a shortcoming in current clinical HDAC6 inhibitory drugs.

ISSN: 2584-2781

University of Illinois, Chicago had reported that carbazole core is a more suitable ligand for HDAC6 enzyme with high selectivity and potency [Butler et al. 2010]. In our study, we found that Indian Medicinal plant, Murraya koenigii (Curry leaf) is rich in carbazole alkaloids. It has been found that MK-1 as potent antiproliferative carbazole alkaloid against breast cancer using bioactivity guided isolation in curry leaf extract and inhibited HDAC6 enzyme activity. Further modifications as designer carbazoles, yielded dual targeted potential cancer chemotherapeutics addressing simultaneous tubulin polymerisation inhibition and histone deacetylase 6 inhibitions. Its logical designing, mechanistic study and preclinical development will be discussed in detail.

Keywords: *Cancer epigenetics, Curry leaf, Carbazoles, histone deacetylase 6*

INADDP/PT/ON/20

CAFTARIC ACID AS A MULTI-TARGET PHYTOCHEMICAL FOR DIABETIC RETINAL AND PERIPHERAL NEUROVASCULAR INJURY: MOLECULAR BASIS AND THERAPEUTIC POTENTIAL

Vikrant Singh[1], Siva Prasad Panda[1*]

[1]*Institute of Pharmaceutical Research, GLA University, Mathura*
Email Id: *svikrant98@gmail.com*

Abstract:

Diabetic retinopathy (DR) and diabetic neuropathy (DN) represent complex neurovascular complications of chronic hyperglycaemia in which metabolic, redox, inflammatory and microvascular perturbations converge to promote progressive neuronal and vascular dysfunction. Hyperglycaemia-driven mitochondrial electron transport dysfunction and NADPH oxidase activation increase reactive oxygen species (ROS), which subsequently amplify advanced glycation end-product/receptor (AGE–RAGE), protein kinase C (PKC), polyol and hexosamine pathway flux. The resulting redox disequilibrium contributes to endothelial dysfunction, blood-retinal barrier disruption, capillary non-perfusion, neuroinflammation, axonal injury and apoptosis. Caftaric acid (caffeoyltartaric acid), a hydroxycinnamate derivative, emerges as a mechanistically plausible multi-target candidate because of its potent aqueous-phase radical-scavenging capacity and reported antioxidant, anti-inflammatory and cytoprotective activities. Its therapeutic relevance may extend beyond direct ROS quenching through

ISSN: 2584-2781

modulation of endogenous redox defence, inflammatory signalling and mitochondrial homeostasis. In the retina, these effects could potentially attenuate oxidative injury, endothelial dysfunction, neuroglial activation and disruption of neurovascular coupling. In peripheral neural tissues, suppression of oxidative and inflammatory stress may preserve mitochondrial integrity, axonal homeostasis and neuronal survival. Importantly, the proposed utility of caftaric acid in DR and DN remains to be experimentally established, warranting systematic evaluation using cellular, animal and translational models. Investigating its effects on Nrf2/ARE-dependent cytoprotective signalling, NF-κB-mediated inflammation, AGE–RAGE signalling, mitochondrial redox homeostasis and neurovascular integrity may provide a rational framework for defining its therapeutic potential.

Keywords**:** *Caftaric acid; Caffeoyltartaric acid; Diabetic retinopathy; Diabetic neuropathy; Neurovascular dysfunction; Oxidative stress*

INADDP/PT/ON/21

A REVIEW ON PHARMACOLOGICAL ACTIVITIES OF *BRYOPHYLLUM PINNATUM.* LINN.

*Mr. Bhaskar[1]**
[1]Madhyanchal Professional University, Ratibad, Bhopal, M.P.

Abstract:

Bryophyllum pinnatum is one of the important and most commonly used plant belongs to the family crassularaceae. This plant is mainly used as a tropical medicinal plant in India, America and other countries. The presence of various chemical constituents in this plant can be used as a medicine for various diseases. The important chemical constituents present in the plant include alkaloids, triterpenes, flavonoids, lipids, glycosides, phenols, bufadienolides, and organic acids. Due to the presence of these chemical constituents *Bryophyllum pinnatum* shows various pharmacological activities like, nephroprotective, antioxidant, analgesic, anti-diabetic, antimicrobial, anticonvulsant antipyretic, and neuropharmacological activity. This review covers various pharmacological activities of the plant *Bryophyllum pinnatum.*

Keywords**:** Bryophyllum pinnatum, Plant, glycosides, leaves.

ISSN: 2584-2781

INADDP/PT/OF/22

NANOTECHNOLOGY APPROACHES IN MODERN THERAPEUTICS: ADVANCING HERBAL DRUG DELIVERY SYSTEMS

Khyati[1], *Richa Srivastava*[1*]
1.Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow, 226028 (India)
Email Id: *rsrivastava1@lko.amity.edu*

Abstract:

Herbal medicines have been trusted for centuries for their healing properties, offering natural antioxidant, antiinflammatory, and immuneboosting effects. Their use in modern healthcare often faces challenge such as many herbal compounds do not dissolve well, are quickly broken down in the body, or show inconsistent absorption. These limitations reduce their effectiveness and make it difficult to achieve reliable results. Nanotechnology is now providing smart solutions such as use of nanoscale carriers such as liposomes, nanoparticles, and nanogels, herbal compounds can be protected, stabilized, and released in a controlled way. These carriers act like tiny delivery vehicles, ensuring that herbal actives reach the right tissues at the right time. For example, nanocurcumin shows stronger antiinflammatory and heartprotective effects than regular turmeric, while nanosilymarin improves liver health more effectively than crude extracts. Nanogreen tea and nanoginseng formulations have also demonstrated better antioxidant and vascular benefits. Researchers are further combining nanotechnology with advanced systems like bioadhesive polymers, gastroretentive devices, and even 3Dprinted scaffolds to create new oral and implantable herbal formulations. These approaches not only improve therapeutic outcomes but also reduce the need for frequent dosing, making treatments more patientfriendly. The blend of traditional wisdom with cuttingedge science, these nanoherbal systems would represent a promising future for safer and smarter healthcare.

Keywords**:** *Nanotechnology, Herbal drug delivery, Nanoformulations, Smart nanocarriers, Bioavailability enhancement, Precision therapeutics*

INADDP/PT/OF/23

UNVEILING HERBAL PATHWAYS IN HEPATIC AND CARDIOVASCULAR PROTECTION THROUGH NANOTECHNOLOGY

ISSN: 2584-2781

Aloyna Chatterjee[1], *Richa Srivastava* [1*]
1.Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow, 226028 (India)
Email Id: *rsrivastava1@lko.amity.edu*

Abstract:

Herbal medicine continues to show promise in protecting the heart and liver, largely due to its antioxidant, anti-inflammatory, and vascular-supporting properties. Botanicals such as green tea, turmeric, and ginger work together to reduce oxidative stress, a key factor in both cardiovascular and hepatic disease. Evidence suggests that combinations of herbal compounds are more effective than single ingredients in calming inflammation and improving vascular outcomes.
Nanotechnology is now transforming the use of herbal compounds by encapsulating phytochemicals in nanocarriers—such as liposomes, polymeric nanoparticles, and solid lipid nanoparticles. Hence, researchers can improve absorption, control release, and deliver them directly to target tissues. This approach not only enhances therapeutic effects but also reduces risks of herb–drug interactions. For example, nano-curcumin shows stronger anti- inflammatory and cardioprotective activity than crude turmeric, while nano-green tea polyphenols provide superior antioxidant protection for liver cells. Similarly, nano- silymarin (milk thistle) formulations improve liver enzyme profiles, and nano-ginseng enhances circulation and endothelial function.
These advances demonstrate how nanotechnology can overcome traditional limitations of herbal medicine, such as poor solubility and inconsistent bioavailability. Together, herbs and nanocarriers offer a powerful, integrative strategy for managing cardiovascular and hepatic disorders. Future work must focus on clinical validation, safety assessment, and regulatory frameworks to ensure that nano-herbal therapies move from promising research into practical healthcare solutions.

Keywords**:** *Nano-herbal therapeutics, Cardiovascular protection, Hepatoprotective nanocarriers, Polyphenolic synergy, Targeted drug delivery*.

INADDP/PT/OF/24

AI-DRIVEN NANOCARRIER DESIGN: A CLOSED-LOOP FRAMEWORK FOR INTEGRATING COMPUTATIONAL DRUG DISCOVERY AND PRECISION DRUG DELIVERY

ISSN: 2584-2781

Ansh Pandey[1], Rabiya Ahsan*[2]
[1] *College of Pharmacy, Integral University, Lucknow, India*
[2] *Assistant Professor, College of Pharmacy, Integral University, Lucknow, India*
Email Id: *pansh@student.iul.ac.in*

Abstract:

Despite advances in computational drug discovery and nanomedicine, drug candidate selection and nanocarrier development are frequently optimized as separate processes, limiting opportunities for integrated and iterative decision-making. This review proposes a closed-loop, AI-driven framework that connects computational drug discovery with precision-oriented nanocarrier design. Computational approaches, including molecular docking, quantitative structure–activity relationship (QSAR) modelling, virtual screening, and ADMET prediction, can facilitate the identification and prioritization of promising drug candidates. These candidates can subsequently be integrated with machine-learning models for data-driven prediction and optimization of nanocarrier characteristics, including particle size, polydispersity index, zeta potential, encapsulation efficiency, drug loading, and release behavior. Targeting strategies can further be incorporated into AI-assisted formulation selection to support site-specific drug delivery and potentially reduce off-target exposure. The proposed framework establishes an iterative computational–experimental feedback loop in which in silico predictions guide drug and formulation selection, experimental characterization generates new datasets, and model refinement progressively informs subsequent optimization. This approach shifts nanocarrier development from predominantly trial-and-error screening toward a predictive, adaptive, and data-driven paradigm. However, successful translation will depend on addressing limitations involving data quality, model interpretability, biological complexity, reproducibility, regulatory validation, and clinical applicability. Overall, this integrated framework provides a conceptual basis for linking drug discovery and nanocarrier engineering within a unified AI-assisted workflow, with the potential to accelerate the rational development of next-generation precision therapeutics.

Keywords: *Artificial intelligence, Machine learning, Nanocarriers, Computational drug discovery, Precision drug delivery, Nanomedicine*

ISSN: 2584-2781

INADDP/PT/OF/25

ENRICHMENT OF GYMNEMIC ACIDS FROM *GYMNEMA SYLVESTRE* LEAVES AND EVALUATION OF VAXORELAXANT ACTIVITY

Abhishek Yadav[1], Debabrata Chanda[2], Prasant Kumar Rout[1],
[1]*Phytochemistry Division, CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow 226015, Uttar Pradesh, India*
[2]*Bio-prospection and Product Division, CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow 226015, Uttar Pradesh, India*
Email Id: abhishek.cimap25a@acsir.res.in

Abstract:

Gymnema sylvestre (Retz.) R.Br. is a well-known antidiabetic plant rich in gymnemic acids (GAs). Dried leaves were extracted using a hydro-ethanolic (7:3) solvent system to obtain a crude extract (Gym-Crude). The crude extract was acidified to pH 3 using 10% HCl to obtain an enriched gymnemic acid fraction. The enriched extract was subjected to sequential alkaline and acidic hydrolysis using KOH in methanol 20% by weight and H_2SO_4 10% by weight in methanol respectively. The resulting mixture was purified by flash chromatography over silica gel (230–400 mesh) using a $CHCl_3$–MeOH gradient containing 1% formic acid, with gradually increasing polarity, to isolate Gymnemagenin. The Gymnema enriched extract (300 µg/mL) exhibited 47.73 ± 3.23% relaxation in the mesenteric artery and 25.74 ± 6.0% relaxation in the aorta. In comparison, the isolated gymnemagenin (30 µM) showed a pronounced vasorelaxant effect, producing 59.44 ± 1.88% relaxation in the mesenteric artery and 61.62 ± 2.12% relaxation in the aorta. These findings indicated that both the Gymnema enriched extract and gymnemagenin possess vasorelaxant activity, with gymnemagenin showing comparatively higher activity.

Key words: *Gymnemic acid, Enriched extract, Gymnemagenin, Vasorelaxation*

INADDP/PT/ON/26

THERAPEUTIC POTENTIAL OF *CLERODENDRUM COLEBROOKIANUM* WALP. LEAF EXTRACT IN TNBS-INDUCED COLITIS: EVIDENCE FROM DISEASE ACTIVITY, HEMATOLOGICAL AND HISTOPATHOLOGICAL OUTCOMES

ISSN: 2584-2781

Diptimayee Jena[1], Manish Kumar Gautam[1], Kirtimaya Mishra[2]
[1]Faculty of Pharmaceutical Sciences, Assam down town University, Guwahati, Assam
[2]School of Pharmacy & Life Sciences, Centurion University of Technology & Management, Bhubaneswar, Odisha
Email Id: diptimayee.pharma@gmail.com

Abstract

Diarrhoea, abdominal pain, blood in the stool, weight loss, and nutritional problems are some of the clinical signs of ulcerative colitis, a recurring inflammatory disease of the large intestine. Pharmacologists have shown keen interest in *Clerodendrum colebrookianum* Walp., a conventional herbal medicine, due to its varied phytochemical content. The current study investigated the pharmacological efficacy of *Clerodendron colebrookianum* leaves extract (CCE) on colitis. Leaves of *C. colebrookianum* were collected, authenticated, and subjected to extraction through an ethanolic maceration technique resulting in 12.7% yield of the extract. The presence of alkaloids, tannins, saponins, phenols, sugars, steroids, flavonoids, terpenoids, glycosides, and phytosterols was determined in the plant after preliminary phytochemical analysis. After determination of the safety of the extracts, anti-colitic study was carried out on TNBS-induced colitis. Six sets of animal groups (n=6) were created: normal control group, disease control group, & CCE 100, 200, and 400 mg/kg groups. For 14 days, treatments were given orally once a day. The Disease Activity Index (DAI), faecal blood, stool consistency, food and drink consumption, and changes in body weight were all used to track the progression of the illness. Hematological indicators and histological changes in colonic tissue were also evaluated. Significant illness symptoms, such as increased DAI, decreased body weight and food intake, increased water intake, hematological changes, and widespread mucosal ulcers with epithelial breakdown, were brought on by TNBS treatment. These alterations were lessened by CCE therapy, with the 200 mg/kg dose showing the strongest response. DAI dropped by 58.0% on Day 7, from 2.78 in the TNBS disease-control group to 1.17 with CCE 200 mg/kg. DAI dropped to 0.11 by Day 14, which is 96.1% less than the TNBS disease-control group. By Day 14, CCE 200 mg/kg also increased food intake from 9.6 g to 23.6 g and restored body weight from 198 g to 243 g in the disease-control group. Hematological results demonstrated improvement, including recovery of hemoglobin from 10.4 to 12.0 g/dL and a decrease in WBC count from 12.8 $\times 10^3/\mu L$

ISSN: 2584-2781

in the disease-control group to 9.2 ×10³/µL with CCE 200 mg/kg. Following CCE 200 mg/kg treatment, histopathological analysis showed decreased ulceration and inflammatory damage as well as enhanced mucosal integrity.

Keywords**:** *Ulcerative colitis, Inflammatory disease, Clinical assessment, Experimental colitis, Disease Activity Index (DAI), Faecal blood, Stool consistency, Food and drink consumption*

INADDP/PY/OF/27

RECENT ADVANCEMENTS IN TUBERCULOSIS THERAPY

Himanshu Singh[1], Varsha Tiwari[1]*, Abhishek Tiwari[1]
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India
Email Id: *vtiwari@lko.amity.edu*

Abstract:

Tuberculosis (TB) remains a major global infectious disease, with multidrug-resistant (MDR) and extensively drug-resistant (XDR) strains posing substantial therapeutic challenges. Recent advances, including BPaL/BPaLM regimens, have enabled 6-month treatment for drug-resistant TB. Host-directed therapies (HDTs), such as metformin, statins, vitamin D, and NSAIDs, target autophagy, inflammation, and metabolic pathways to enhance treatment outcomes. Meanwhile, CRISPR-based diagnostics and whole-genome sequencing facilitate rapid resistance detection, while artificial intelligence, machine learning, and robotics support diagnosis, resistance prediction, and personalized therapy. In 2024, the WHO endorsed 6 months of daily levofloxacin (Lfx) as tuberculosis preventive treatment (TPT) for individuals exposed to MDR/rifampicin-resistant TB. This regimen offers favorable cost-effectiveness, safety, efficacy, and minimal interference with HIV treatment. However, pre-extensively drug-resistant (pre-XDR) TB, particularly MDR-TB with quinolone resistance, remains a growing concern. Ongoing trials, including PHOENIx-MDR TB and BRANCH-TB, are evaluating alternative preventive approaches involving delamanid- and bedaquiline-based regimens. Despite these advances, preventing MDR/rifampicin-resistant TB remains a major challenge. Broader preventive options for pre-XDR TB and strategies to overcome drug intolerance are urgently required. Continued clinical trials and innovative research will be essential for developing effective preventive

ISSN: 2584-2781

regimens, shortening treatment, and advancing global TB elimination efforts.

***Keywords*:** *Tuberculosis, TPT, MDR, pre-XDR TB*

INADDP/PY/ON/28

NEUROPROTECTIVE POTENTIAL OF FERMENTED ETHANOLIC EXTRACT OF DICTYOTA BARTAYRESIANA BY TARGETING GUT-BRAIN AXIS: AN IN-SILICO STUDY

Ayushi Singh1, Lucy Mohapatra1*, Himani Awasthi[2]

1Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028

2Hygia Institute of Pharmaceutical Education and Research, Lucknow

**Email: lmohapatra@lko.amity.edu, dr.lucymohapatra@gmail.com*

Abstract:

Gut-brain axis refers to a bidirectional communication pathway between the gut and the CNS, which has been found to be disrupted due to neuroinflammation, oxidative stress, blood brain barrier disruption, and impaired cognitive functions. Marine macroalgae possess numerous bioactive metabolites having potential antioxidant, anti-inflammatory, and neuroprotective properties. Dictyota bartayresiana, a brown seaweed, has several secondary metabolites that could have possible neuroprotective effects. In this study, the possibility of neuroprotective effect of a fermented ethanolic extract of D. bartayresiana was studied using an in-silico methodology. The possible interaction of bioactive metabolites of the extract with target proteins involved in neuroinflammation, neural activities, and intestinal permeability was determined. In order to analyze the interactions with such molecular targets as BDNF, NF-κB, and occludin, along with other proteins related to inflammation, oxidative stress, and neuronal survival, the methods of molecular docking and network pharmacology was used. The modulation of the NF-κB might imply that neuroinflammation signaling is inhibited by the extract, while the interactions with BDNF might denote the improvement of neuronal survival and synaptic plasticity. Occludin was taken into consideration as an important marker of the tight junctions in the intestine, which will serve as a possible connection between the integrity of the gut barrier and the health of the brain. Further studies regarding pathways and interactions might provide additional insights into the molecular mechanisms

ISSN: 2584-2781

through which the fermented algae extract works on the gut-brain axis. All in all, this study is going to provide the necessary information concerning the potential bioactive compounds and molecular targets for the D. bartayresiana.

Keywords**:** *Gut-brain axis, Neuroprotection, Neuroinflammation, Seaweed and Fermented ethanolic extract*

INADDP/PY/ON/29

LALLEMANTIA ROYLEANA: A NATURAL PLATFORM FOR NEXT-GENERATION THERAPEUTICS

Aransha Maurya1,2, Suyashi Mishra1, Uma Shankar1, Akshita Chakravarty1, Shivani Sahu1, Vaishali Sahu1, Sudeep Tandon1,2, Ram Swaroop Verma1,2,*
1Phytochemistry Division, CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP), PO CIMAP, Lucknow 226015, India
2Academy of Scientific and Innovative Research (AcSIR), Ghaziabad 201002, Uttar Pradesh, India
** **Email**: rsverma.cimap@csir.res.in*

Abstract:

Lallemantia royleana (Benth.) Benth, commonly known as Balangu, a medicinal and aromatic plant in the family Lamiaceae, has attracted interest due to its diverse phytochemical constituents and multifunctional seed mucilage. To determine a future research roadmap, this study examined the phytochemical profile, biological activities, physicochemical properties, and emerging nanotechnology-based applications of L. royleana, with a focus on its potential as a natural platform for advanced bioactive delivery. In traditional medicine, it is used to treat gastrointestinal, respiratory, urinary, renal, hepatic, and nervous disorders. The seeds contain carbohydrates, proteins, fibre and oil, whereas the seed mucilage is predominantly composed of high-molecular-weight polysaccharides with notable water-binding, thickening and rheological properties. Phenolic and flavonoid compounds and volatile constituents of the essential oil contribute to reported antioxidant, antibacterial, antifungal, antiviral, analgesic and hepatoprotective activities. More importantly, the mucilage has demonstrated potential as a functional carrier in nano-enabled systems. L. royleana seed gum/polyvinyl alcohol nanofibers have been investigated for encapsulating and delivering bioactive plant extracts. Green-synthesised silver nanoparticles using leaf extract showed enhanced antioxidant and antimicrobial activity compared with the extract alone. These findings position L. royleana at the

ISSN: 2584-2781

interface of natural-product chemistry and nanotechnology, facilitating the development of sustainable, multifunctional and nano-enabled delivery systems with potential therapeutic applications. The study revealed substantial research gaps in secondary metabolite profiling and in the scientific validation of specific traditional uses of L. royleana, despite advances in comprehensive pharmacological screening and seed mucilage analysis.

Keywords: *Lallemantia royleana, Therapeutic uses, Primary metabolites, Secondary metabolites, Research gaps*.

INADDP/PY/ON/30

TARGETING THE INFLAMED GUT: EMERGING NANOTECHNOLOGIES FOR PRECISION THERAPY OF INFLAMMATORY BOWEL DISEASE

Nivedita Chatterjee*1, Varsha Tiwari1, Abhishek Tiwari1, Manish Kumar2
1. Amity University Uttar Pradesh, Lucknow Campus, Lucknow- 226028
2. KIET School of Pharmacy, KIET (Deemed to be University), Ghaziabad, Uttar Pradesh, India
***Email id:** vtiwari@lko.amity.edu*

Abstract:

Inflammatory bowel disease is an autoimmune disorder with relapsing gastrointestinal disorder characterized by dysregulated immune responses to intestinal microbiota in genetically and environmentally susceptible individuals. It mainly comprises ulcerative colitis, affecting predominantly the colon and rectum and Crohn disease, which can involve any region of the gastrointestinal tract. Persistent inflammation and epithelial barrier disruption cause diarrhoea, abdominal pain, rectal bleeding, weight loss, and fatigue, significantly impairing quality of life.

Conventional therapies, including amino-salicylates, corticosteroids, immunomodulators, biologics, and small-molecule drugs are often constrained by poor solubility, instability, limited intestinal residence, inadequate bioavailability and systemic adverse effects. Nanotechnology-based precision therapy offers a promising approach by enabling site-specific drug accumulation, protection of therapeutic agents, and sustained or stimuli-responsive release. Polymeric, lipid-based, biomimetic, and multifunctional nanocarriers can target inflamed intestinal tissues and respond to pathological cues, including reactive oxygen species and altered pH.

Phytoconstituent-loaded nanocarriers

ISSN: 2584-2781

further integrate the anti-inflammatory, antioxidant, immunomodulatory, and microbiota-modulating properties of natural bio-actives with nanoscale delivery. By improving solubility, stability, bioavailability, and mucosal retention, these systems may enhance therapeutic efficacy while reducing systemic toxicity, supporting the transition toward precision and personalized nanomedicine for IBD.

Key words- *IBD, Novel drug delivery system, Nano-formulations, phytoconstituents*

Pharmaceutical Chemistry & allied branches

ISSN: 2584-2781

INADDP/PC/OF/01

NEW HETEROCYCLIC SCAFFOLDS SURPASSING THE LIMITS OF CONVENTIONAL ANTIULCER AGENTS: A REVIEW

Ashutoshh, Nishi Gupta
Department of Pharmaceutical Chemistry, Department of Pharmaceutical Chemistry, United Institute of Pharmacy, Naini, Prayagraj 211010 India

Abstract:

Peptic ulcer disease continues to be a significant problem in the gastrointestinal system, causing considerable health issues. This condition is influenced by several factors, including infection with the Helicobacter pylori bacteria, regular use of non-steroidal anti-inflammatory drugs, oxidative stress, and weak protection of the mucosal lining. Conventional treatments for ulcers, such as proton pump inhibitors and histamine H2 receptor blockers, have helped in controlling symptoms; however, they still lead to recurring ulcers, side effects, interactions with other medicines, and are not fully effective against the various causes of ulcers. These shortcomings have created a need for more advanced treatment options that are more effective and work through a wider range of mechanisms. In recent times, researchers have been focusing on new compounds, based on heterocyclic chemical structures as possible treatments for ulcers. These newer drugs are being studied for their ability to work in multiple ways, such as reducing acid production, preventing oxidative damage, protecting stomach cells, reducing inflammation, and fighting H.pylori infection. Moreover, new approaches are being developed to improve the healing of the stomach lining and better restore balance in the stomach environment compared to traditional treatments alone. Overall, current review suggests that new heterocyclic derivatives could serve as a good basis for developing safer and more effective ulcer treatments. Further preclinical and clinical validation is needed to establish their therapeutic relevance and translational potential.

Keywords*: Peptic ulcer, anti-Helicobacter pylori, Cytoprotective activity, Antiulcer, Antioxidant*

INADDP/PC/OF/02

KIDNEY-ON-A-CHIP: A NEXT-GENERATION PLATFORM FOR MODELING RENAL PHYSIOLOGY AND DRUG-INDUCED NEPHROTOXICITY

Pathan Faizankhan[1], Jagdish Kakadiya[1]*
[1]Department of Pharmacology, Faculty of Pharmacy, Parul University, Vadodara, India

ISSN: 2584-2781

Abstract:

Drug-induced nephrotoxicity is a challenging issue in pharmaceutical studies due to the limited capability of traditional two-dimensional cell cultures and animal models to predict human responses to xenobiotics. The kidney-on-a-chip technology represents a novel approach to model physiological and pathological processes in the human kidney. The review considers the preclinical nephrotoxicity models based on kidney-on-a-chip micro-physiological systems. The kidney chips could be used for the development of nephrotoxicity assays by recapitulating the organization of the renal proximal tubules and incorporating relevant cellular responses to toxicants. Experimental evidence supports the application of kidney-on-a-chip technology for studying the molecular mechanism of nephrotoxicity and developing therapies against kidney diseases. Proximal-tubule-on-a-chip systems could be applied to study the nephrotoxic effects of cisplatin and polymyxin antibiotics and assess the corresponding biomarkers and transporters. The proposed in vitro models could be instrumental in advancing kidney physiology research, pharmaceutical discovery, and toxicology studies while reducing the use of animals in preclinical experiments. Nevertheless, the complexity of the kidney function and its endocrine and exocrine roles, along with other factors, requires further optimization of the kidney-on-a-chip technology. The review discusses the opportunities and challenges of kidney organoids and micro-physiological systems in biomedical research and drug discovery. Moreover, the integration of stem cell technologies, biosensors, microscopes, and other approaches with organ-on-a-chip systems could promote the progress of nephrology and toxicology and improve kidney disease treatment. Overall, kidney-on-a-chip systems could serve as the next generation of kidney physiology models that enable pharmaceutical studies and nephrotoxicity assessments.

Keywords: *Kidney-on-a-chip, Nephrotoxicity, Drug screening, Renal physiology, Microfluidics*

INADDP/PC/OF/03

HETEROCYCLIC COMPOUND–NANOPARTICLE HYBRIDS: A PROMISING STRATEGY FOR ANTIDIABETIC DRUG DEVELOPMENT

*Shivangi, Akanksha Gupta**
Department of Pharmaceutical Chemistry, United Institute of Pharmacy, Naini, Prayagraj 211010 India
***Corresponding author:** shivangitripathi9919@gmail.com

ISSN: 2584-2781

Abstract:

Diabetes is a major global health challenge that requires new and safer treatment options. Heterocyclic compounds are important in drug discovery because their structures can interact effectively with biological targets linked to blood glucose control. However, many of these compounds face problems such as poor solubility, low absorption, and limited stability in the body. To overcome these issues, researchers are combining heterocyclic compounds with nanoparticles to create hybrid drug systems. This approach can improve drug delivery, increase bioavailability, and help the medicine reach the target site more efficiently. Nanoparticles can also support controlled release, which may reduce side effects and improve therapeutic effectiveness. As a result, heterocyclic compound–nanoparticle hybrids offer a promising platform for designing next-generation antidiabetic drugs. With continued research, this strategy may lead to better medicines that are more effective, safer, and longer acting for diabetes management.

Keywords: *Diabetes, heterocyclic compounds, nanoparticles, drug delivery, bioavailability, controlled release, antidiabetic drugs*

INADDP/PC/OF/04

DESIGN, SYNTHESIS AND *IN VITRO* EVALUATION OF NOVEL PYRAZOLINE DERIVATIVES WITH POTENTIAL ANTIBACTERIAL ACTIVITY

Satyam Tiwari[1*], Nishi Gupta[1]

Department of Pharmaceutical Chemistry, United Institute of Pharmacy, Naini, Prayagraj 211010 India

***Corresponding author:** Satyamtiwari190400@gmail.com

Abstract:

The increasing prevalence of bacterial resistance to existing antimicrobial agents has created an urgent need for the development of novel and effective antibacterial compounds. Pyrazoline is an important heterocyclic scaffold that has attracted considerable attention in medicinal chemistry because of its diverse pharmacological properties. The present research focuses on the design and synthesis of novel pyrazoline derivatives incorporating a substituted aromatic framework with the aim of exploring their potential antibacterial activity. The proposed compounds will be synthesized through suitable organic synthetic reactions, followed by purification and structural characterization using

ISSN: 2584-2781

appropriate analytical techniques such as melting point determination, FTIR and NMR spectroscopy. The synthesized derivatives will subsequently be evaluated for their in vitro antibacterial activity against selected bacterial strains using suitable microbiological methods. The antibacterial potential of the synthesized compounds will be compared with an appropriate standard antibacterial drug. The study is expected to identify structurally promising pyrazoline derivatives with significant antibacterial potential and provide useful structure–activity relationship insights for further development of novel antibacterial agents.

Keywords- *Pyrazoline derivatives, Heterocyclic compounds, Organic synthesis, Antibacterial activity, Medicinal chemistry, Structure–activity relationship.*

INADDP/PC/ON/01

ZINC OXIDE NANOPARTICLES IN PRECISION ONCOLOGY: MECHANISMS, THERAPEUTIC APPLICATIONS, SYNTHESIS STRATEGIES, AND TRANSLATIONAL PERSPECTIVES

Shambhavi Shandilya[1], Abhishek Tiwari[1]*, Varsha Tiwari[1]

[1]*Amity institute of pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Uttar Pradesh, India*

***Corresponding Author**: atiwari4@lko.amity.edu*

Abstract:

Cancer remains a major global health challenge, creating an urgent need for therapeutic strategies that improve tumor selectivity while minimizing systemic toxicity. Nanotechnology has emerged as a promising platform for precision oncology, and zinc oxide nanoparticles (ZnO NPs) have attracted considerable attention because of their unique physicochemical properties, biological reactivity, pH-responsive dissolution, and potential anticancer activity. This review provides a comprehensive overview of the emerging role of ZnO NPs in precision cancer therapy, with particular emphasis on their applications in breast cancer. The anticancer activity of ZnO NPs is primarily associated with enhanced cellular uptake, Zn^{2+} release, excessive reactive oxygen species generation, oxidative stress, mitochondrial dysfunction, DNA damage, cell-cycle arrest, and activation of apoptosis through pathways involving p53, Bax/Bcl-2, and caspases. ZnO NPs may also facilitate tumor-directed drug delivery through passive accumulation and can be engineered with targeting ligands to improve cellular specificity. The review further discusses physical, chemical, and

ISSN: 2584-2781

green approaches for ZnO NP synthesis and highlights how synthesis conditions influence particle size, morphology, surface characteristics, stability, and biological performance. Particular attention is given to the opportunities and challenges associated with integrating ZnO NPs with conventional chemotherapy, targeted therapeutics, and other nanomedicine approaches. Despite promising preclinical findings, issues related to tumor heterogeneity, biodistribution, dose-dependent toxicity, reproducibility, long-term safety, and clinical translation remain unresolved. Overall, ZnO NPs represent a promising multifunctional nanoplatform for precision oncology, but systematic mechanistic, toxicological, pharmacokinetic, and clinical studies are required to establish their therapeutic potential and facilitate translation into safe and effective cancer treatments.

Keywords: *Precision Oncology; Zinc Oxide Nanoparticles; pH-Responsive; Dissolution; Oxidative Stress; p53; Bax/Bcl-2.*

INADDP/PC/OF/05

GAS CHROMATOGRAPHY-MASS SPECTROMETRY ANALYSIS OF VOLATILE COMPOUNDS IN INDIAN BLUEGRASS (*BOTHRIOCHLOA PERTUSA*)

Km Shivani Sahu[1,2], Uma Shankar[1], Suyashi Mishra[1], Akshita Chakravarty[1], Aransha Maurya[1], Ram Swaroop Verma[1,2,*]

[1]*Phytochemistry Division, CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP), PO CIMAP Lucknow 226015, India*

[2]*Academy of Scientific and Innovative Research (AcSIR), Ghaziabad 201002, Uttar Pradesh, India*

[*]**Corresponding author:** rsverma.cimap@csir.res.in

Abstract:

With five aromatic species known to grow in India, *Bothriochloa* (Poaceae) is the second largest genus of aromatic grasses. Although most aromatic grasses are found in tropical regions, some *Bothriochloa* species can also be found in temperate regions. *Bothriochloa pertusa* (L.) A. Camus is a grass species, frequently utilized for cattle grazing and feed. South and southeast Asia, which includes India, Nepal, China, Sri Lanka, Pakistan, Thailand, Vietnam, Indonesia, and Malaysia, is the grass's natural habitat. This study aimed to examine the chemical makeup of *B. pertusa* essential oil that was obtained from the CSIR-CIMAP Lucknow. The freshly harvested aerial-parts of the plant was hydro distilled in a Clevenger-type apparatus to extract the essential oil.

ISSN: 2584-2781

The essential oil obtained was dried over anhydrous sodium sulphate. The gas chromatography-flame ionization detector and gas chromatography-mass spectrometry were used to analyse the essential oil. The identification of the essential oil constituents was achieved on the basis of observed linear retention index and mass spectral data. Altogether, 79 constituents representing 96.8% of the total essential oil composition were identified. Major constituents of the essential oil were Acorenone B (23.2%), Limonene (15.2%), Caryophyllene oxide (11.9%), Camphene (7.4%), and β-Caryophyllene (6.7%). The study on *B. pertusa* uses GC-MS to establish a comprehensive profile of its volatile organic compounds, confirming the grass's potential as a source of bioactive compounds for industrial applications.

Keywords: *Bothriochloa pertusa, Poaceae, Essential oil, Acorenone B*

INADDP/PC/OF/06

FRAGRANCE MAPPING OF 59 ROSE CULTIVARS FROM INDIA: LINKING THE CHEMICAL DIVERSITY OF SCENTED AND NON-SCENTED GENOTYPES TO OLFACTORY RECEPTOR INTERACTION

Suyashi Mishra[1,2], Aqib Sarfraz[3], Munmun Kumar Singh[1], Akshita Chakravarty[1], Uma Shankar[1], Km Shivani Sahu[1], Aransha Maurya[1], Ashish Kumar[4], Feroz Khan[3], Rajesh Kumar Verma[4], Ram Swaroop Verma[1,2,*]

[1]*Phytochemistry Division, CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP), PO CIMAP Lucknow 226015, India*

[2]*Academy of Scientific and Innovative Research (AcSIR), Ghaziabad 201002, Uttar Pradesh, India*

[3]*Technology Dissemination and Computational Biology Division, CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP), PO CIMAP Lucknow 226015, India*

[4]*Crop Production and Protection Division, CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP), PO CIMAP Lucknow 226015, India*

[*]**Corresponding author:** rsverma.cimap@csir.res.in

Abstract:

The fragrance of beautiful roses has delighted people since ancient times and is utilised in medicine, cosmetics, and the perfume industry. These days, thousands of rose varieties are used in horticulture, often the result of many hybridisations. *Rosa damascena* (damask rose) and *Rosa* × *hybrida* (modern hybrid roses) are widely valued and revered in India's floriculture

ISSN: 2584-2781

industry. The study used multivariate statistical analysis and headspace solid-phase micro extraction gas chromatography-mass spectrometry (HS-SPME-GC-MS) to investigate the biogenic volatile organic compound (BVOCs) diversity of 59 Indian rose genotypes, including scented and non-scented varieties. Saturated aliphatic hydrocarbons (0.0-92.60%), sesquiterpene hydrocarbons (0.0-82.85%), aliphatic alcohols (0.0-74.48%), benzenoids (0.0-72.03%), phenylethanoids (0.0-62.44%), phenylpropanoids (0.0-17.26%), monoterpene alcohols (0.0-58.81%), and monoterpene esters (0.0-17.50%) were the significant classes of BVOCs distributed among the examined cultivars. To comprehend the biological implications of these profiles, the discovered BVOCs were linked to human olfactory receptor (OR) interactions using an in silico molecular docking approach. According to our research, some volatile signatures in scented cultivars exhibited high binding affinities for key receptors, including OR1A1, OR1A2, OR2A25, OR2W1, OR5B12, OR51L1, and OR52I2. However, these essential ligands were not present in non-scented cultivars. By offering a molecular foundation for scent-blind rose breeding and allowing researchers to tailor genotype selection to specific requirements for unique fragrances, this dual-approach study highlights the potential of Indian rose cultivars for the food, cosmetics, fragrance, and floriculture industries.

Keywords: *Rosa spp, HS-SPME-GC-MS, multivariate analysis, fragrance molecules, molecular docking.*

INADDP/PC/ON/02

INTEGRATIVE MULTI-OMICS ANALYSIS OF GENETIC VARIANTS IN COPD AND ASTHMA USING A PYTHON-BASED COMPUTATIONAL FRAMEWORK

Mohd Arman[1], Ruchi Yadav[1*]

[1]*Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus, Lucknow-226028, India*

***Corresponding author:** ryadav@lko.amity.edu

Abstract:

Chronic Obstructive Pulmonary Disease (COPD) and asthma are major chronic respiratory disorders with substantial global health burdens. Despite overlapping clinical manifestations, these diseases exhibit distinct molecular mechanisms, inflammatory profiles, and responses to therapy. The complex genetic and molecular architecture of COPD and asthma necessitates integrative approaches capable of capturing disease-associated alterations across multiple biological levels. In this study, a Python-based computational framework was developed

ISSN: 2584-2781

to perform integrative multi-omics analysis of genetic variants associated with COPD and asthma. Publicly available disease-relevant datasets were systematically curated to integrate genomic, transcriptomic, and proteomic information. Genetic variants were computationally identified and functionally characterized, followed by integration with gene-expression and protein-level information to prioritize potentially important disease-associated molecular targets. Python-based computational tools were employed for data preprocessing, variant handling, statistical analysis, visualization, and cross-omics integration. Functional enrichment and pathway-level analyses were subsequently performed to investigate the biological processes and molecular networks potentially contributing to disease development and progression. The integrative analysis enabled the identification of molecular associations that may not be apparent from individual omics layers alone. Linking genetic variation with transcriptomic and proteomic alterations provided a systems-level perspective of respiratory disease biology and facilitated prioritization of candidate biomarkers and potential therapeutic targets. The Python-based framework further enhances reproducibility, automation, and scalability of multi-omics data analysis. Overall, this study demonstrates the potential of computational multi-omics integration to elucidate the molecular complexity of COPD and asthma. The proposed framework provides a reproducible strategy for respiratory disease biomarker discovery and may support future precision medicine approaches through improved molecular characterization and identification of clinically relevant targets.

Keywords: *COPD, Asthma, Genetic Variants, Python, Bioinformatics, Biomarker Discovery, Precision Medicine*

INADDP/PC/ON/03

AI-ENABLED COMPUTATIONAL IDENTIFICATION AND FUNCTIONAL PREDICTION OF GENETIC VARIANTS IN PULMONARY FIBROSIS AND INTERSTITIAL LUNG DISEASE

Taiba Fatima[1], Ruchi Yadav[1*]
[1]*Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus Lucknow-226028, India*
***Corresponding author:** *ryadav@lko.amity.edu*

Abstract:

Pulmonary Fibrosis (PF) and Interstitial Lung Disease (ILD) represent a diverse group of chronic and progressive respiratory disorders characterized by excessive extracellular matrix deposition, irreversible lung scarring, and declining pulmonary function. Although several

ISSN: 2584-2781

environmental and molecular factors have been implicated in disease pathogenesis, the contribution of genetic variants to disease susceptibility and progression remains incompletely understood. Advances in next-generation sequencing (NGS) technologies and computational genomics have enabled large-scale exploration of disease-associated genetic alterations, facilitating the discovery of potential biomarkers and therapeutic targets. In the present study, a computational framework was developed to identify and characterize genetic variants associated with PF and ILD using publicly available RNA-Seq datasets. Relevant datasets were retrieved from the European Nucleotide Archive (ENA) based on predefined selection criteria, including organism (Homo sapiens), sequencing strategy, dataset quality, and clinical relevance. Data analysis was performed through the Galaxy bioinformatics platform, incorporating FastQC for quality assessment, Bowtie2 for sequence alignment against the human reference genome (GRCh38), SAMtools for alignment processing, and SnpEff for variant annotation and functional impact prediction. Furthermore, a Python-based

automated workflow was implemented to streamline data processing, integrate analytical modules, manage genomic datasets, and generate comprehensive variant reports. The computational pipeline enabled efficient detection and annotation of genetic variants while improving reproducibility, scalability, and analytical consistency. Functional annotation revealed several variants with potential biological significance in pathways associated with fibrosis, inflammation, and tissue remodeling. The integration of bioinformatics tools with Python programming significantly enhanced workflow automation and data interpretation. This study highlights the utility of computational genomics in uncovering disease-associated genetic variations and provides a reproducible analytical framework for investigating complex respiratory disorders. The proposed workflow may support future precision medicine approaches aimed at improving diagnosis, prognosis, and therapeutic intervention in pulmonary fibrosis and related interstitial lung diseases.

Keywords: *Pulmonary Fibrosis, Interstitial Lung Disease, Computational Genomics, RNA-Seq, Genetic Variants, Variant Annotation, Python, Precision Medicine.*

ISSN: 2584-2781

INADDP/PC/ON/04

NEXT-GENERATION FERULIC ACID DERIVATIVES FOR DIABETIC WOUND HEALING: FROM MOLECULAR DESIGN TO PROPOSED NANOTECHNOLOGY-BASED DELIVERY

Ritwika Jaiswal[1], Amit Kumar Mishra[1*]
[1]*Department of Pharmaceutical Chemistry, United Institute of Pharmacy, Naini, Prayagraj*
***Corresponding author:** jaistwinkle806@gmail.com

Abstract:

Diabetic wound healing remains a major therapeutic challenge due to persistent inflammation, oxidative stress, impaired angiogenesis, and dysregulated extracellular matrix remodeling. Ferulic acid (FA), a naturally occurring phenolic compound, possesses promising antioxidant, anti-inflammatory, and wound-healing properties. However, its therapeutic translation is constrained by physicochemical and biopharmaceutical limitations, including limited aqueous solubility and challenges associated with bioavailability. These limitations highlight the need for innovative drug-discovery and delivery strategies. The present study focuses on the rational design and synthesis of novel FA derivatives as potential therapeutic candidates for diabetic wound healing. Structural modification of the FA scaffold was undertaken to generate a library of 25 novel derivatives with the aim of optimizing their physicochemical and drug-like properties. The synthesized derivatives are being characterized and evaluated for their potential biological activities relevant to diabetic wound repair. Particular emphasis is placed on the potential modulation of the HYAL1/MMP-9 axis, which plays an important role in extracellular matrix degradation, angiogenesis, and tissue remodeling during wound healing. Furthermore, a nanotechnology-based delivery strategy is proposed as a future approach for optimized FA derivatives to overcome delivery-related limitations. Nano-enabled delivery may improve aqueous dispersibility, stability, localised drug delivery, cellular uptake, and therapeutic exposure. Thus, the integrated approach of molecular modification, biological evaluation, and proposed nanotechnology-based delivery may provide a promising pathway toward next-generation ferulic acid- derived therapeutics for improved diabetic wound healing.

Keywords: *Ferulic acid, Novel derivatives, Diabetic wound healing, HYAL1/MMP9, Molecular drug design, Nanotechnology-based drug delivery*

ISSN: 2584-2781

INADDP/PC/OF/07

HARNESSSING ARTIFICIAL INTELLIGENCE FOR NEXT-GENERATION ANTI- INFLAMMATORY DRUG DISCOVERY

Neha Yadav[1]*

[1]Department of Pharmaceutical Chemistry, United Institute of Pharmacy, Prayagraj, India

Corresponding Author: nyadav682005@gmail.com

Abstract:

Inflammation plays an important role in many diseases, ranging from shortterm inflammatory conditions to chronic disorders. Although several antiinflammatory drugs are available, their use can sometimes be associated with unwanted side effects and limitations in selectivity. This has created a need for safer and more effective therapeutic agents. In recent years, Artificial Intelligence (AI) has emerged as a promising tool in drug discovery and is helping researchers explore new possibilities in medicinal chemistry. AI-based approaches can analyse large amounts of chemical and biological information and assist in identifying promising drug candidates in a shorter time. Techniques such as machine learning, deep learning, molecular docking, virtual screening, QSAR, and pharmacophore modell ing can be used to predict drug target interactions, biological activity, drug-likeness, and toxicity at an early stage of development. These approaches can also support the optimization of lead molecules and help researchers select the most promising candidates for further experimental evaluation. This review discusses the growing role of AI in anti-inflammatory drug discovery, with emphasis on target identification, virtual screening, lead optimization, and prediction of important drug properties. The integration of AI with conventional medicinal chemistry may provide a more efficient approach for discovering novel anti-inflammatory agents. However, challenges related to data quality, model reliability, interpretation, and experimental validation still need to be addressed.

Overall, AI offers considerable potential to accelerate the discovery of safer, selective, and effective anti- inflammatory therapeutics for future healthcare.

Keywords: *Artificial Intelligence, Anti-inflammatory Drugs, Drug Discovery, Machine Learning, Molecular Docking, QSAR*

INADDP/PC/ON/05

INTEGRATED QUALITY BY DESIGN

ISSN: 2584-2781

STRATEGY FOR ANALYTICAL AND BIOANALYTICAL METHOD DEVELOPMENT OF ANTI-DIABETIC DRUGS OPTIMIZATION VALIDATION AND APPLICATION.

Vivek B Patil[1*]
[1]*Dcs's A.R.A College of Pharmacy Nagaon, Dhule*

Abstract:

The development of reliable analytical and bioanalytical methods is essential for the quality control, safety, efficacy, and therapeutic evaluation of anti-diabetic drugs. Conventional method development is generally based on trial-and-error approaches, which can be time-consuming and may provide limited understanding of the relationship between critical method variables and analytical performance. The present study aims to establish an integrated Quality by Design (QbD**)** strategy for the systematic development, optimization, validation, and application of analytical and bioanalytical methods for selected anti-diabetic drugs. The proposed approach begins with the definition of an Analytical Target Profile (ATP**)**, followed by risk assessment for the identification of critical method attributes and critical method parameters. Design of Experiments (DoE) is employed to evaluate and optimize significant experimental variables, including chromatographic conditions, mobile-phase composition, pH, flow rate, temperature, detection wavelength, and sample preparation parameters. The optimized methods are evaluated through response surface methodology and establishment of a method operable design region to ensure robustness and consistent performance. Analytical and bioanalytical methods are validated according to applicable regulatory requirements for parameters such as specificity, selectivity, linearity, accuracy, precision, recovery, sensitivity, robustness, and stability. The validated methods are subsequently applied for the quantitative determination of anti-diabetic drugs in pharmaceutical formulations and biological matrices. The integrated QbD approach is expected to provide enhanced understanding of method performance, improved robustness and reproducibility, reduced experimental effort, and greater assurance of reliable results throughout the analytical method lifecycle. Thus, the study demonstrates the potential of an integrated QbD framework as a scientifically sound and regulatory-oriented strategy for the development and routine application of high-quality analytical and bioanalytical methods for anti-diabetic drugs.

Keywords: *Quality by Design; Analytical Target Profile**;** Specificity; Robustness; Pharmaceutical formulations*

ISSN: 2584-2781

INADDP/PC/ON/06

DESIGN AND IN-SILICO EVALUATION OF NOVEL ISOXAZOLE DERIVATIVES AS POTENTIAL HSP90 INHIBITORS FOR BREAST CANCER

Vaishnavi Choudhary[1]*, Ravi Pratap Pulla[1]
[1]*Department of Pharmaceutical Chemistry, Parul Institute of Pharmacy and Research, Parul University, Vadodara*

Abstract:

Breast cancer remains a major global health challenge, emphasizing the need for the discovery of novel therapeutic candidates. Heat shock protein 90 (HSP90), a molecular chaperone involved in the stabilization and maturation of several oncogenic client proteins, has emerged as a promising target for anticancer drug discovery. In the present study, a library of 50 novel isoxazole derivatives was designed and evaluated using an integrated in-silico approach to identify potential HSP90-targeting candidates. Molecular docking studies were performed to assess the binding affinity of the designed derivatives within the HSP90 binding site. Among the evaluated compounds, molecule 43 exhibited the most favourable docking score of -9.4 kcal/mol, followed by molecules 41 (-9.2 kcal/mol), 37 and 42 (-9.0 kcal/mol), compared with the reference standard (-8.5 kcal/mol). The top-ranked derivatives were further subjected to SwissADME analysis to evaluate their physicochemical, pharmacokinetic and drug-likeness properties. The prioritized compounds demonstrated favourable predicted profiles, including high gastrointestinal absorption, absence of predicted blood–brain barrier permeation, zero Lipinski rule violations and a bioavailability score of 0.55. Integration of molecular docking and ADME findings enabled the prioritization of molecules 43, 41, 37 and 42 as promising candidates for subsequent chemical synthesis and experimental biological evaluation. These findings support the potential of isoxazole derivatives as promising HSP90-targeting scaffolds
for further investigation in breast cancer drug discovery.

Keywords: *Isoxazole, HSP90, Breast cancer, Molecular docking, ADME, Drug design*

INADDP/PC/ON/07

COMPUTER-AIDED DRUG DESIGNING AND MOLECULAR DOCKING STUDIES OF COUMARIN DERIVATIVES AS POTENTIAL ANTI-DIABETIC AGENTS

ISSN: 2584-2781

Sumit Sharma[1*], Ravi Pratap Pulla[1]
[1]*Department of Pharmaceutical Chemistry, Parul Institute of Pharmacy and Research, Parul University, Vadodara*

Abstract:

Type 2 diabetes mellitus is a major metabolic disorder that necessitates the development of safer and more effective therapeutic agents. Coumarin, a naturally occurring benzopyrone scaffold, possesses diverse pharmacological properties and provides considerable scope for structural modification. The present study aimed to design coumarin derivatives and evaluate their potential interaction with human dipeptidyl peptidase-4 (DPP-4), an important therapeutic target in type 2 diabetes mellitus, using computer-aided drug design and molecular docking approaches. A series of 35 coumarin derivatives was evaluated against human DPP-4 (PDB ID: 1X70) using AutoDock Vina. The docking scores of the designed derivatives were compared with the standard DPP-4 inhibitors Sitagliptin (SS036) and Vildagliptin (SS037). Among the designed derivatives, SS004 exhibited the most favourable predicted binding affinity (-9.5 kcal/mol), followed by SS010 (-9.4 kcal/mol), SS003 (-9.3 kcal/mol), SS006 (-9.2 kcal/mol), and SS005 (-9.0 kcal/mol). Sitagliptin and Vildagliptin showed docking scores of -7.1 kcal/mol each. SwissADME analysis indicated favourable drug-likeness characteristics for the top-ranked compounds, including high predicted gastrointestinal absorption and zero Lipinski rule violations. ProTox-3.0 prediction showed inactive results for hepatotoxicity, mutagenicity, cytotoxicity, immunotoxicity and cardiotoxicity for SS004, SS010, SS006 and SS005, whereas SS003 showed an active carcinogenicity prediction. Based on the integrated computational assessment, SS004 and SS010 were prioritized as promising coumarin-based lead candidates for further investigation against DPP-4.

Keywords: *Coumarin derivatives; Type 2 diabetes mellitus; DPP-4; AutoDock Vina; SwissADME; ProTox-3.0*

INADDP/PC/OF/08

THIAZOLE AND ITS DERIVATIVES: ADVANCES IN SYNTHESIS, PHARMACOLOGICAL ACTIVITIES, AND THERAPEUTIC APPLICATIONS

Alka Verma[1], Abhishek Tiwari[1]*, Varsha Tiwari[1]
[1]*Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus -226028, India*
***Corresponding author:** atiwari4@lko.amity.edu*

ISSN: 2584-2781

Abstract:

Thiazole is a privileged five-membered aromatic heterocyclic scaffold containing nitrogen and sulfur atoms that has attracted considerable attention in synthetic chemistry, medicinal chemistry, and pharmaceutical research. Its aromaticity, electronic flexibility, and diverse substitution possibilities at the C-2, C-4, and C-5 positions enable systematic structural modification and optimization of biological and physicochemical properties. The thiazole nucleus occurs in several natural products, bioactive molecules, and clinically important therapeutic agents, highlighting its broad biological significance. Classical synthetic approaches, including the Hantzsch thiazole synthesis, Cook–Heilbron synthesis, Herz synthesis, and modified Hantzsch synthesis, together with condensation, cyclization, heterocyclization, and environmentally benign methodologies, provide efficient routes for generating structurally diverse thiazole derivatives. Pharmacological investigations have demonstrated that thiazole-based compounds possess a wide spectrum of biological activities, including antibacterial, antifungal, antiviral, antitubercular, antimalarial, anti-inflammatory, antidiabetic, antioxidant, anticancer, anticonvulsant, antihypertensive, and anti-Alzheimer activities. Several derivatives act through biologically relevant targets such as tyrosine kinases, epidermal growth factor receptor, c-Met, cyclooxygenases, lipoxygenases, DPP-IV, and other enzymes and signaling pathways. Contemporary approaches integrating molecular docking, molecular dynamics, density functional theory, structure–activity relationship studies, and artificial intelligence/deep-learning-assisted drug design are further facilitating target identification, virtual screening, activity prediction, and lead optimization. Future research should emphasize green synthesis, late-stage functionalization, multitarget and target-selective thiazole hybrids, improved pharmacokinetic properties, toxicity prediction, and AI-guided molecular design. Collectively, the remarkable chemical versatility and pharmacological diversity of thiazole establish this scaffold as a valuable platform for discovering and developing next-generation therapeutic agents.

Keywords: *Thiazole; Hantzsch thiazole synthesis; Cook–Heilbron synthesis; Herz synthesis; Anticancer; Antimicrobial; Anti-inflammatory; Antidiabetic.*

INADDP/PC/OF/09

S-TRIAZINE DERIVATIVES AS PROMISING ANTIMICROBIAL

ISSN: 2584-2781

AGENTS

Ravi Kant[1], Akanksha Gupta[1*]
[1]*Department of Pharmaceutical Chemistry, United Institute of Pharmacy, Naini, Prayagraj,*
Uttar Pradesh, India
***Corresponding author:** ravikant55222@gmail.com

Abstract:

Antimicrobial resistance is a growing global health concern, creating a need for new and effective antimicrobial agents. S-Triazine is an important nitrogen-containing heterocyclic scaffold with considerable potential in medicinal chemistry. Its three substitution sites allow the introduction of different substituents, facilitating structural modification and optimization of biological activity. Various s-triazine derivatives containing amino, anilino, sulphonamide, morpholine and other pharmacophoric groups have demonstrated promising antibacterial and antifungal activities. Their antimicrobial effects may involve inhibition of essential microbial enzymes, disruption of cellular processes and interference with microbial growth. Structural modifications of the triazine nucleus can significantly influence potency, selectivity and physicochemical properties. This review summarizes the synthesis, structural modifications, antimicrobial activity and structure–activity relationships of s-triazine derivatives, highlighting their potential as promising lead compounds for the development of new antimicrobial agents against drug-resistant microorganisms.

Keywords: *S-Triazine, antimicrobial agents, antibacterial activity, antifungal activity, heterocyclic compounds, drug resistance.*

INADDP/PC/OF/10

DESIGN, SYNTHESIS AND EVALUATION OF NOVEL BENZOTHIAZOLE-BASED DERIVATIVES AS NEXT-GENERATION ORAL ANTI-INFLAMMATORY AGENTS USING NANOTECHNOLOGY-BASED DELIVERY

Sanjay Kumar[1], *Amit Kumar Mishra*[1]*
[1]*Department of Pharmaceutical Chemistry, United Institute of Pharmacy, Naini, Prayagraj*
***Corresponding author:** sk2154374@gmail.com

Abstract:

Inflammatory disorders continue to represent a significant therapeutic challenge, while limitations associated with conventional anti-inflammatory drugs highlight the need for safer and more

ISSN: 2584-2781

effective therapeutic strategies. The present research proposes the development of next-generation benzothiazole-based anti-inflammatory agents integrated with nanotechnology-based oral drug delivery. Benzothiazole, a biologically versatile heterocyclic scaffold, will be structurally modified to generate novel derivatives with the potential for enhanced anti-inflammatory activity and favorable drug-like properties. The designed derivatives will be synthesized and characterized using appropriate spectroscopic and analytical techniques. Their anti-inflammatory potential will be investigated through suitable in-vitro and/or in-vivo experimental models. Promising derivatives will subsequently be explored for incorporation into an appropriate nanotechnology-based oral delivery system with the objective of improving aqueous solubility, dissolution behaviour, oral bioavailability and therapeutic performance. The developed nanoformulation will be evaluated for key pharmaceutical characteristics, including particle size, polydispersity index, zeta potential, entrapment efficiency, drug loading and in-vitro drug release. Molecular docking and ADMET studies may further support the investigation of molecular interactions, pharmacokinetic properties and drug-likeness. This integrated drug-design and nanotechnology approach is expected to provide promising next-generation benzothiazole-based therapeutic candidates and may offer a potential platform for the development of improved orally active anti-inflammatory agents.

Keywords: *Benzothiazole; Next-generation therapeutics; Anti-inflammatory; Nanotechnology; Oral drug delivery; Nano-formulation; Molecular docking*

INADDP/PC/OF/11

FROM OBESITY TO CANCER RISK: NANO-ENABLED NATURAL PRODUCT DRUG DISCOVERY THROUGH CADD-GUIDED IDENTIFICATION OF PT1B INHIBITORS FROM *BARLERIA TERMINALIS*

Rashmi[1], Sali Tiwari[1]
[1]*Goel Institute of Pharmacy and Sciences, Lucknow, Uttar Pradesh, India*
Corresponding Author: rashmi030919@gmail.com

Abstract:

Obesity is a major global health concern and is associated with insulin resistance, chronic low-grade inflammation, metabolic dysregulation and an increased risk of several cancers. Protein Tyrosine Phosphatase 1B (PTP1B), a negative regulator of insulin and leptin signalling, is an important molecular target for obesity

ISSN: 2584-2781

management. Natural phytochemicals are promising candidates for drug discovery; however, poor solubility, instability, and limited bioavailability may restrict their therapeutic translation. Nano-enabled delivery of natural compounds has been explored as a strategy to improve their pharmaceutical performance. The present study aimed to identify potential PTP1B-inhibiting phytoconstituents from *Barleria terminalis* using a computer-aided drug discovery (CADD) approach and to provide a literature-supported rationale for nano-enabled development in obesity management. Ten selected phytoconstituents of *B. terminalis* were evaluated against the PTP1B crystal structure (PDB ID: 1XBO; X-ray resolution 2.50 Å). Molecular docking was performed to assess predicted ligand–protein binding, followed by ADME and drug-likeness profiling. Computational screening identified several phytoconstituents with promising predicted binding affinity and favourable drug-likeness characteristics. Selected compounds showed favourable interactions with key residues of the PTP1B active site, supporting their consideration as potential inhibitor candidates. Quercetin showed a favourable computational profile and provides a useful link to published research on nano-enabled delivery of natural products. These findings provide preliminary computational support for further experimental validation and future investigation of nano-enabled delivery strategies to improve the pharmacological performance of selected natural-product leads. The obesity–cancer relationship provides broader translational context; however, the present study does not claim anticancer activity or demonstrate cancer-risk reduction.

Keywords: *PTP1B; Barleria terminalis; obesity; CADD; molecular docking; ADME; quercetin; nano-enabled drug delivery; natural products; nanotechnology.*

INADDP/PC/ON/08

AI-Driven Spatial Multi-Omics and Nanotechnology: A Convergence for Next-Generation Therapeutics

Prakhar Pandey[1], Sumit Singh[1], Nisha Sharma[1], Anupriya Kapoor[1]*

[1]*School of Pharmaceutical Sciences, Chhatrapati Shahu Ji Maharaj University, 208024, Kanpur Uttar Pradesh*

Abstract:

Nanotechnology, spatial multi-omics, and artificial intelligence (AI) are opening up new possibilities for developing next-generation therapies. Multiple biological components, including genes, RNA, proteins, and metabolites can be studied

ISSN: 2584-2781

through spatial multi-omics, as well as localization of molecular changes in the tissue. Understanding the disease etiology, cell interactions, and the differences between healthy and diseased tissue are greatly facilitated thereby. Spatial multi-omics, however, creates a vast amount of complicated data. Machine learning and artificial intelligence can assist in analyzing this data efficiently. With the help of AI, one can discover important patterns, identify potential biomarkers, predict changes associated with disease, and identify novel targets for therapy. In this way, AI helps scientists make a breakthrough in drug discovery by enabling them to understand complicated biological data. Nanotechnology can help convert such findings into medicinal systems. Drugs can be delivered precisely to targeted tissues or cells through nanocarriers, such as polymeric nanoparticles, liposomes, niosomes, and other nanotechnology-based drug-delivery strategies. AI can be used to predict the loading of drugs, targeting efficiency, drug release profile, and nanoparticle properties. The abstract focuses on discussion of role of AI in spatial multi-omics, and generation of new nanotechnological approaches for the treatment of disease. The core concept is to use artificial intelligence to identify suitable therapeutics and understand the operations being performed. The next stage is to make use of nanotechnology for effective drug delivery. This infusion of cutting-edge technologies into healthcare will lead to more precise, better personalized, proper, and effective cures in the future.

Keywords: *Spatial Multi-Omics, Artificial Intelligence, Nanotechnology, Precision Medicine, Next-Generation Therapeutics*

INADDP/PC/ON/09

NEXT-GENERATION THERAPEUTICS: INTEGRATING NANOTECHNNOLOGY WITH ADVANCED DRUG DISCOVRY PLATFORMS

Saniya Khan[1], Komal Yadav[2]*
[1]Pharmaceutical Chemistry, Jahangirabad Institute of Technology, Barabanki, India
[2]Pharmaceutics, Jahangirabad Institute of Technology, Barabanki, India
***Corresponding author:** komalyadvanshi@gmail.com

Abstract:

The development of next-generation therapeutics requires innovative approaches that can overcome the limitations of conventional drug discovery and delivery systems. Nanotechnology, combined with advanced drug discovery platforms, has emerged as a promising strategy for improving therapeutic efficacy, selectivity, and safety. Nanoparticles can

ISSN: 2584-2781

be engineered to enhance drug solubility, stability, bioavailability, and controlled release while enabling targeted delivery to specific tissues or cells. At the same time, modern drug discovery platforms, including artificial intelligence (AI), molecular docking, high-throughput screening, and structure-based drug design, accelerate the identification and optimization of potential drug candidates. Integrating these technologies enables rational design of nano-enabled therapeutics with improved pharmacokinetic and pharmacodynamic profiles. Furthermore, nanotechnology can facilitate the delivery of poorly soluble drugs, biologics, nucleic acids, and combination therapies. This integrated approach has significant potential in areas such as cancer, infectious diseases, neurological disorders, and metabolic diseases. Overall, the convergence of nanotechnology and advanced drug discovery represents a transformative pathway toward more precise, personalized, effective, and safer therapeutics.

Keywords: *Nanotechnology; Solubility; Stability; Bioavailability; Artificial Intelligence; Pharmacokinetic; Pharmacodynamic.*

INADDP/PC/ON/10

SILVER NANOPARTICLES IN PRECISION ONCOLOGY: MECHANISMS, THERAPEUTIC APPLICATIONS, SYNTHESIS STRATEGIES, AND TRANSLATIONAL PERSPECTIVES

Shivam Pandey[1], Abhishek Tiwari[1]*, Varsha Tiwari[1]

[1]*Amity institute of pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India*

***Corresponding Author:** atiwari4@lko.amity.edu*

Abstract:

Cancer remains a major global health challenge, necessitating the development of innovative therapeutic approaches capable of improving tumor selectivity, therapeutic efficacy, and patient safety. Silver nanoparticles (AgNPs) have emerged as promising nanomaterials in oncology because of their distinctive physicochemical properties, high surface area, tunable morphology, surface reactivity, and broad biological activity. This review provides a comprehensive overview of the emerging applications of AgNPs in precision oncology, focusing on their molecular mechanisms, therapeutic potential, synthesis strategies, and translational challenges. AgNPs can exert anticancer effects through multiple interconnected mechanisms, including

ISSN: 2584-2781

reactive oxygen species generation, oxidative stress, mitochondrial dysfunction, DNA damage, cell-cycle arrest, inhibition of proliferation and migration, and induction of apoptosis. The release of Ag^+ ions and interactions of nanoparticles with cellular and intracellular components further contribute to their biological activity. AgNPs have demonstrated promising preclinical activity against several malignancies, including breast, lung, colorectal, hepatic, ovarian, cervical, and hematological cancers. Their surfaces can also be engineered with drugs, polymers, antibodies, peptides, or other targeting ligands to improve tumor-specific delivery and enable combination therapeutic strategies. Physical, chemical, and green/biological synthesis approaches provide opportunities to tailor particle size, morphology, surface chemistry, and biological performance. However, challenges involving dose-dependent cytotoxicity, biodistribution, nanoparticle stability, protein-corona formation, off-target effects, long-term accumulation, reproducibility, and manufacturing remain important barriers to clinical translation.

Keywords: *Silver nanoparticles; AgNPs; precision oncology; cancer nanotechnology; anticancer therapy; oxidative stress; apoptosis; targeting; green synthesis; nanomedicine*.

INADDP/PC/OF/12

QUINOLINE-BASED THERAPEUTICS: ADVANCES IN SYNTHESIS, MOLECULAR TARGETS, PHARMACOLOGICAL ACTIVITIES, AND EMERGING DRUG-DISCOVERY STRATEGIES

Aakriti Tripathi[1], Abhishek Tiwari[2*], Varsha Tiwari[3]

[1]*Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus -226028, India*

[*]**Corresponding author:** atiwari4@lko.amity.edu

Abstract:

Quinoline, a nitrogen-containing heterocyclic scaffold, has evolved from a classical organic chemistry curiosity into one of the most privileged frameworks in modern drug discovery. Its structural versatility, favorable electronic properties, and broad-spectrum bioactivity have enabled the design of therapeutics spanning antimalarial, anticancer, antimicrobial, antiviral, antitubercular, anti-inflammatory, antioxidant, antidiabetic, neuroprotective, and cardiovascular applications. This review provides a comprehensive account of quinoline chemistry, beginning with its historical development and the molecular basis underlying its pharmacological

ISSN: 2584-2781

versatility, including interactions with enzymes, DNA, kinases, and various receptor systems. Key molecular targets such as topoisomerases, EGFR, VEGFR, the PI3K/Akt/mTOR pathway, tubulin, HDAC, and pathogen-specific proteins are discussed to highlight the mechanistic diversity of quinoline-based agents. The article further examines the evolution of synthetic strategies, from classical routes such as Skraup, Friedländer, Doebner–Miller, Combes, Conrad–Limpach, and Pfitzinger syntheses to contemporary green and sustainable approaches, including nanocatalysis, transition-metal-free methods, photocatalysis, electrochemical synthesis, and microwave/ultrasound-assisted techniques. Clinically approved quinoline drugs and candidates under investigation are summarised alongside recent patents (2024–2026) reflecting ongoing innovation. Finally, the review addresses current challenges, including drug resistance and selectivity issues, and outlines future perspectives centred on green manufacturing, precision medicine, and AI-assisted molecular design, underscoring quinoline's continued relevance as a scaffold for next-generation therapeutic development.

Keywords- *Quinoline; DNA, kinases; Conrad–Limpach synthesis; microwave-assisted synthesis; Green synthesis; Antimalarial and anticancer agents*

INADDP/PC/ON/11

IMMUNOINFORMATICS-GUIDED DESIGN OF A MULTI-EPITOPE VACCINE CANDIDATE TARGETING SORCIN FOR GALLBLADDER CANCER

Monika Moitra[1], Ruchi Yadav*[1]
[1]*Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus Lucknow-226028, India*

Corresponding author:
monika.moitra1@s.amity.edu
ryadav@lko.amity.edu

Abstract:

Gallbladder cancer (GBC) is an aggressive gastrointestinal malignancy with a particularly high incidence in the Gangetic belt of India. The limited availability of effective targeted preventive and therapeutic strategies highlights the need for novel approaches to cancer intervention. Sorcin (SRI), a calcium-binding protein, is frequently overexpressed in GBC and has been associated with tumor progression, drug resistance, invasion, migration, and inhibition of apoptosis, making it a potential candidate for immunotherapeutic targeting. The present study aimed to computationally design a multi-epitope

ISSN: 2584-2781

vaccine candidate targeting SRI using an integrated immunoinformatics approach. Potential B-cell linear epitopes, cytotoxic T-lymphocyte (CTL) epitopes, and T-cell epitopes associated with MHC class I and class II molecules were identified using tools available through the Immune Epitope Database (IEDB). Selected T-cell epitopes were evaluated for their association with relevant HLA alleles and subjected to population coverage analysis to assess their potential applicability across diverse populations. The selected epitopes were subsequently assembled into a multi-epitope vaccine construct using AAY, GPGPG, and EAAKEAAK linker sequences. Additional functional sequences, including β-globin, tissue plasminogen activator (tPA), CD40 ligand, MHC-I targeting domain (MITD), and α-globin-derived regions, were incorporated to enhance the designed construct's immunological and structural characteristics. Molecular docking analysis of the vaccine construct with Toll-like receptor 1 (TLR1) using the HDOCK server produced a docking score of −236 kcal/mol, suggesting favourable receptor–ligand interaction. Finally, the construct was reverse-translated and codon-optimized using JCat, followed by incorporation of a human Kozak sequence and poly(A) tail to facilitate potential expression in a mammalian system. Overall, the study presents an immunoinformatics-driven multi-epitope vaccine candidate against SRI-associated gallbladder cancer**,** providing a computational framework for further experimental validation and development of personalized cancer immunotherapeutic strategies.

Keywords: *Gallbladder cancer; Sorcin; Multi-epitope vaccine; Immunoinformatics; T-cell epitopes; MHC; Molecular docking; Codon optimization*

NADDP/PC/ON/12

PRIVILEGED HETEROCYCLIC SCAFFOLDS IN NEXT-GENERATION ANTICANCER DRUG DISCOVERY: FROM RATIONAL DESIGN TO PRECISION THERAPEUTICS

Neelima Shrivastava

Abstract:

Cancer remains a major health challenge, and the development of effective and selective anticancer drugs is an important goal of medicinal chemistry. Heterocyclic scaffolds are widely used in drug discovery because of their structural diversity, favourable binding properties, and ability to interact with different biological targets. This review highlights the importance of privileged heterocyclic scaffolds in the

ISSN: 2584-2781

development of next-generation anticancer agents, with emphasis on quinoline, quinazoline, indole, benzimidazole, pyrazole, thiazole, and oxadiazole derivatives. Recent strategies such as molecular hybridization, scaffold modification, and structure–activity relationship studies are discussed for improving potency and selectivity. The role of computer-aided drug-design approaches, including molecular docking, virtual screening, ADMET prediction, and molecular dynamics simulation, in the identification and optimization of promising heterocyclic leads is also highlighted. In addition, the integration of heterocyclic drug design with precision medicine and nanotechnology-based targeted delivery may provide new opportunities to improve therapeutic efficacy and reduce unwanted effects. Overall, privileged heterocyclic scaffolds provide a versatile platform for designing innovative anticancer agents and, when combined with advanced drug-discovery technologies, may contribute to the development of more selective and effective cancer therapies.

Keywords: *Heterocyclic scaffolds, Anticancer agents, Medicinal chemistry, Molecular hybridization, Computer-aided drug design, Precision medicine*

INADDP/PC/ON/13

MEDICINAL MUSHROOMS FOR ANTI-CANCER ACTIVITY

Karuna Nagula[1]***,** Rudra Soni[2]

[1]*Amity Institute of Pharmacy, Amity University Maharashtra, Mumbai Pune Expressway, Bhatan, Post Somathane, Panvel, Mumbai 410206*

[2]*Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul University, Vadodara, India*

***Corresponding author:** knnagula@mum.amity.edu

Abstract:

Cancer is one of the leading diseases with high mortality and incidence. The mushrooms with anti-cancer activity are a rarely explored area of research. The unusual source of anti-cancer activity possessing bioproducts is studied in this work. An effective formulation of such products is needed that can be used in the treatment and recovery of cancer patients. Three different sources of anti-cancer activity possessing sources have been studied. Cordycepin from medicinal mushroom *Cordyceps* and sulfated polysaccharide from *Ulva* have been prepared and optimized for stability and

ISSN: 2584-2781

activity. The in-situ hydrogel of cordycepin and Ulvan has been prepared to be given at the target location of cancer. The formulation was found to remain stable, and evaluation was conducted.

Keywords: *Cordycepin, Fungus, Anticancer, mushrooms, cervix cancer*

INADDP/PC/OF/13

TARGETING KYNURENINE 3-MONOOXYGENASE WITH PIPERINE: AN INTEGRATED *IN SILICO AND IN VITRO* EVALUATION

*Mohammed Kashif Jamal**[1], Alok S. Tripathi[1]

[1]*Era College of Pharmacy, Era University, Lucknow, 226003, Uttar Pradesh, India*

Corresponding Author : *kashifjamal5151@gmail.com*

Abstract:

The Gut dysbiosis alters kynurenine pathway due to increase in production of lipopolysaccharide (LPS), which further enhances kynurenine 3-monooxygenase (KMO) activity to promote the production of quinolinic acid. Quinolinic acid is an N-methyl-D-aspartate (NMDA) agonist, which promotes calcium influx and microglial activation lead to neuroinflammation. This study was design to investigate the effect of piperine against kynurenine 3-monooxygenase (KMO). Natural bioactive compounds were selected form IPAD-DB, a manually curated database of inhibitors associated with proteins relevant to Alzheimer's disease and related biological targets. The compounds were docked against KMO and filtered by ADME&T criteria. Piperine emerged as the most favourable candidate and further KMO inhibitory activity was evaluated by using the KMO enzyme inhibition assay kit. Among the screened natural bioactive compounds, piperine showed most favourable profile with the molecular docking energy of -8.5 kcal/mol and binding pose. Moreover, pharmacokinetic and toxicity profile of piperine was also observed to be favourable for neuroprotective. IC50 of piperine for the KMO inhibition was observed to be 27.41 µM. Piperine was prioritized as the lead compound from the IPAD-DB database screening workflow because it showed the best balance of binding affinity and in-silico pharmacokinetic suitability. Its potential relevance to gut-brain axis-linked neuroinflammation makes it a biologically meaningful candidate for further study.

Keywords: *Gut dysbiosis; LPS; KMO; Quinolinic acid; piperine; neuroinflammation*

ISSN: 2584-2781

INADDP/PC/OF/14

AI-DRIVEN NANOCARRIER DESIGN: A CLOSED-LOOP FRAMEWORK FOR INTEGRATING COMPUTATIONAL DRUG DISCOVERY AND PRECISION DRUG DELIVERY

Ansh Pandey[1], Rabiya Ahsan*[1]
[1] *College of Pharmacy, Integral University, Lucknow, India*
Corresponding Author :*pansh@student.iul.ac.in*

Abstract:

Despite advances in computational drug discovery and nanomedicine, drug candidate selection and nanocarrier development are frequently optimized as separate processes, limiting opportunities for integrated and iterative decision-making. This review proposes a closed-loop, AI-driven framework that connects computational drug discovery with precision-oriented nanocarrier design. Computational approaches, including molecular docking, quantitative structure–activity relationship (QSAR) modelling, virtual screening, and ADMET prediction, can facilitate the identification and prioritization of promising drug candidates. These candidates can subsequently be integrated with machine-learning models for data-driven prediction and optimization of nanocarrier characteristics, including particle size, polydispersity index, zeta potential, encapsulation efficiency, drug loading, and release behaviour. Targeting strategies can further be incorporated into AI-assisted formulation selection to support site-specific drug delivery and potentially reduce off-target exposure. The proposed framework establishes an iterative computational–experimental feedback loop in which in silico predictions guide drug and formulation selection, experimental characterization generates new datasets, and model refinement progressively informs subsequent optimization. This approach shifts nanocarrier development from predominantly trial-and-error screening toward a predictive, adaptive, and data-driven paradigm. However, successful translation will depend on addressing limitations involving data quality, model interpretability, biological complexity, reproducibility, regulatory validation, and clinical applicability. Overall, this integrated framework provides a conceptual basis for linking drug discovery and nanocarrier engineering within a unified AI-assisted workflow, with the potential to accelerate the rational development of next-generation precision therapeutics.

Keywords: *Artificial intelligence, Machine learning, Nanocarriers, Computational drug discovery, Precision drug delivery,*

ISSN: 2584-2781

Nanomedicine

INADDP/PC/ON/14

ONE POT SYNTHESIS OF BIOACTIVE PYRAZOLE DERIVATIVES USING NATURAL ORGANIC ACID CATALYSTS AND EVALUATION OF THEIR ANTI-INFLAMMATORY POTENTIAL

Bhumi Agarwal [1], Nanda Kishor Agarwal *[1], Bal Krishna Singh [1]

[1] *Department of Pharmaceutical Chemistry, Aryakul College of Pharmacy and research, Lucknow, Uttar Pradesh, India*

Corresponding author: *Bhumiagarwal4916@gmail.com*

Abstract:

Pyrazole derivate represent an important class of nitrogen-containing heterocyclic and have attracted considered attention due to their diverse biological activities. The present study focuses on the development of an efficient one pot synthesis approach for the preparation of Bioactive Pyrazole Derivatives Using a natural organic acid as a catalyst. One pot synthesis in an attractive strategy in organic chemistry because multiple transformations can be carried out in a single reaction vessel, thereby simplifying the synthesis procedure and potentially reduced reaction time, solvents consumption, and waste generation. In the proposal study, suitable starting material will be subjected to a one pot reaction in the presence of a natural organic acids catalyst under optimized reaction condition to obtain the desired pyrazole derivatives. The synthesized compounds will be purified and characterized using suitable analytical and spectroscopic techniques the confirm to structure. Furthermore, the synthesized pyrazole derivatives will be evaluated for their potential anti- inflammation activities using an appropriate biological evaluation method . The study aims to develop an efficient and comparatively environmentally friendly approach for the synthesis of biologically relevant pyrazole derivatives. The synthesized compounds may provide useful leads for further investigation of pyrazole-based molecule with potential anti inflammation properties and demonstrate the applicability of greener synthetic methodologies in medicinal chemistry.

Keywords: *Pyrazole, Anti- inflammation, Synthesized, Lead, Medicinal Chemistry*

INADDP/PC/OF/15

AI-DRIVEN PREDICTION OF NANOPARTICLE TOXICITY AND BIODISTRIBUTION: BRIDGING A CRITICAL GAP IN NEXT-GENERATION NANOMEDICINE

ISSN: 2584-2781

Faisal Alam[1], Samar Mujeeb*[1]
1.College of Pharmacy, Integral University, Lucknow, India

Email: *faisalfa@student.iul.ac.in*

Abstract:

While artificial intelligence (AI) has been widely applied to accelerate nanoparticle design, drug loading optimization, and targeted delivery, its use in predicting nanoparticle toxicity and biodistribution remains comparatively underexplored, despite these factors being decisive bottlenecks in clinical translation. This review critically examines recent advances in machine learning and deep learning models applied specifically to nanotoxicology and pharmacokinetic prediction, including quantitative nanostructure-toxicity relationship (nanoQSTR) models, graph neural networks for predicting cellular uptake, and physiologically based pharmacokinetic (PBPK) models enhanced by AI for forecasting organ-level biodistribution. Unlike prior reviews that broadly summarize AI-nanomedicine integration across the discovery pipeline, this work narrows focus to the safety-prediction stage, synthesizing evidence on how AI models incorporate physicochemical descriptors (size, surface charge, coating chemistry) to predict immunogenicity, hepatotoxicity, and off target accumulation before in vivo testing. Key challenges are identified, including data scarcity and heterogeneity across nanoparticle toxicity datasets, poor model generalizability across nanocarrier classes, and the current lack of regulatory-accepted validation frameworks for AIpredicted safety profiles. The review further explores emerging solutions such as federated learning across multi-institutional toxicity databases and explainable AI (XAI) approaches to improve regulatory trust and interpretability of predictions. By consolidating this fragmented but rapidly growing body of literature, the review aims to highlight actionable directions for integrating predictive toxicology earlier into the nanomedicine design pipeline, ultimately reducing preclinical attrition and supporting safer, faster clinical translation of nanotechnology-based therapeutics.

Keywords: *nanotoxicology, artificial intelligence, biodistribution prediction, nano-QSTR, explainable AI, drug delivery*

INADDP/PC/OF/16

NANOTECHNOLOGY-ENABLED IMIDAZOLE DERIVATIVES: AN ADVANCED APPROACH TO DRUG DISCOVERY AND TARGETED THERAPEUTICS

Harshita Shrivastav[*1]

ISSN: 2584-2781

Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow, 226028 (India)

Email: *harshita.shrivastav@s.amity.edu*

Abstract:

Nanotechnology-enabled imidazole derivatives are helping to improve drug discovery. These compounds use the imidazole structure. They are combined with advanced nanoscale delivery systems. The imidazole ring and its fused forms are often found in medicine. They have chemical features. They are electron-rich and polar. They can act as both acids and bases. These characteristics allow them to interact with biological targets. This includes enzymes, receptors, and DNA. Because of this ability, they show promise in treating cancer.

They also help fight infections. They reduce inflammation. Structural optimization, which includes scaffold design and electron-withdrawing substitutions, has made things better. It has increased selectivity. Also made the compounds more powerful. Now computer tools, such as docking, molecular dynamics, DFT, and AI-based QSAR, are helping more and more. These tools are guiding the selection of the leads. They are also helping with ADMET prediction. Nanotechnology helps solve the problems that many imidazole derivatives face.These problems include solubility, low bioavailability, instability and unwanted toxicity. Nanotechnology does this by using nanoparticles, lipid carriers, metal-based systems and hybrid nanostructures. Zeolitic imidazolate frameworks are very promising because of their pore size, large surface area, ability to work well with living things and ability to carry many different types of cargo to be used for imaging that targets specific areas and to release things when the pH level changes. Preclinical studies show better tumor targeting, better combination therapy, antimicrobial activity and early signs of biocompatibility.. Clinical translation is still early and will need stronger, in vivo validation, detailed pharmacokinetic characterization, and scalable green synthesis.

Keywords: *Nanotechnology; Imidazole derivatives; Drug discovery; Targeted drug delivery; Imidazole ring; Fused imidazole; Nanoparticles; Lipid carriers; Metal-based nanocarriers; Hybrid nanostructures*

INADDP/PC/ON/15

IN-SILICO PHARMACOKINETIC AND ADME/TOX ANALYSIS OF PHYTOCHEMICALS FROM *HIPPOPHAE* FOR THEIR THERAPEUTIC POTENTIAL

ISSN: 2584-2781

Himanshu Rawal[1], Yukti Nautiyal*[1], Vineet Kumar Maurya[1]
1.Applied Microbiology Laboratory, Department of Botany, and Microbiology, Hemvati Nandan Garhwal University (A Central University), Srinagar Garhwal, Uttarakhand, 246174, India.

***Corresponding Author** :hrawal240@gmail.com*

Abstract:

Hippophae L. (Elaeagnaceae), commonly known as sea buckthorn, is a phytochemically rich medicinal plant containing flavonoids, carotenoids, tocopherols, phytosterols, organic acids, and unsaturated fatty acids. Despite its diverse chemical composition and therapeutic potential, the pharmacokinetic and safety profiles of many of its constituents remain insufficiently characterized. The present study evaluated the drug-likeness, pharmacokinetic, toxicity, and medicinal chemistry properties of 214 *Hippophae* phytochemicals using an integrated *in silico* approach based on SwissADME- and pkCSM-type descriptors, empirical drug-likeness filters, regression analysis, and principal component analysis (PCA). The analysis revealed considerable variation in physicochemical and pharmacokinetic properties across the phytochemical dataset. Compliance with drug-likeness filters was highest for the Veber (58.88%), followed by Egan (34.11%), Lipinski (28.50%), Ghose (21.50%), and Muegge (6.07%). Predicted gastrointestinal absorption was low for 61.21% of the compounds, while 81.31% were predicted to be non-permeable to the blood–brain barrier, reflecting the predominantly polar and structurally complex nature of the phytochemical library. Toxicity predictions indicated that 85.5% of the compounds were non-hepatotoxic and 96.26% were Ames-negative. PCA demonstrated that the first two principal components explained 47.09% of the total variance and revealed partial overlap between the *Hippophae* phytochemical space and an approved-drug comparison set. Overall, the findings provide a systematic pharmacokinetic and toxicological overview of *Hippophae* phytochemicals and identify promising chemical space for further prioritization. The study supports the selection of suitable constituents for compound-level validation, target prediction, molecular docking, and experimental ADME/Tox evaluation, thereby facilitating the exploration of *Hippophae* as a potential source of drug-like natural products.

***Keywords**: Hippophae L., sea buckthorn, phytochemicals, in silico ADME, pharmacokinetics, drug-likeness, principal component analysis, natural products.*

ISSN: 2584-2781

INADDP/PC/OF/17

FROM VIRTUAL SCREENING TO QUANTUM CHEMICAL VALIDATION: AN INTEGRATED COMPUTATIONAL STRATEGY FOR DISCOVERING THIAZOLE-BASED XANTHINE OXIDASE INHIBITORS

Nupur Jaiswal[1], Rahul K. Maurya*[1], Alok S. Tripathi[2]

[1] *Amity Institute of Pharmacy, Amity University Uttar Pradesh Lucknow Campus, Lucknow, 226028, India*

[2]*ERA College of Pharmacy, ERA University, Lucknow, Uttar Pradesh, India*

Corresponding Author : *rkmaurya@lko.amity.edu, rahulkumarmaurya@gmail.com*

Abstract:

Xanthine oxidase (XO) is an established therapeutic target for reducing uric acid production in gout; however, structurally diverse natural compounds, particularly thiazole-based chemotypes, remain comparatively underexplored as potential XO inhibitors. In this study, an integrated in silico workflow was employed to identify and characterize thiazole-containing natural compounds with favorable XO-binding properties. A total of 10,586 thiazole-containing natural compounds were retrieved from the COCONUT database and filtered using Lipinski's rule of five and PAINS criteria with druglikeFilter 1.0. The filtered compounds were subjected to consensus virtual screening against XO using Glide, followed by Prime MM-GBSA rescoring. The top-ranked candidates were further investigated by molecular dynamics (MD) simulations using Desmond v2021.4 for up to 200 ns, with RMSD, RMSF, radius of gyration (Rg), 2D-PCA, and 3D-FEL analyses used to assess structural stability and conformational behavior.

Four compounds, namely CNP0259475, CNP0472606, CNP0403609, and CNP0486839, exhibited superior predicted binding affinities compared with the co-crystal ligand quercetin and the reference drug febuxostat. Their MM-GBSA binding free energies were −66.66, −65.13, −64.38, and −59.86 kcal/mol, respectively, compared with −59.76 kcal/mol for quercetin and −57.06 kcal/mol for febuxostat. MD simulations demonstrated stable complex formation and convergence, with RMSD values maintained within approximately 2.0 Å. Predictive toxicity profiling identified potential toxicity liabilities that warrant further lead optimization. Overall, the identified thiazole-based natural chemotypes represent promising starting points for the development of novel XO inhibitors; however, experimental validation, pharmacological evaluation, and structural optimization are essential to

ISSN: 2584-2781

confirm their therapeutic potential.

Keywords: *Xanthine oxidase (XO); MM-GBSA rescoring; MD simulations; COCONUT; Febuxostat; druglike Filter*

INADDP/PC/OF/18

FROM DOCKING TO ASSAY: BIOLOGICAL VALIDATION OF OPTIMIZED FLAVONE LEADS IN RHEUMATOID ARTHRITIS MODEL

Rama Singh[1], Neha Mathur*[1]
[1]*Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, India 226028*
Corresponding Author :*nmathur1@amity.edu; neha07.mathur@gmail.com*

Abstract:

Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disorder characterized by persistent synovial inflammation, progressive cartilage degradation, and bone destruction. Despite the clinical efficacy of existing anti-rheumatic therapies, limitations associated with adverse effects, inadequate response, and disease recurrence highlight the need for structurally novel and safer therapeutic candidates. Flavones, a structurally diverse class of polyphenolic compounds, have attracted considerable attention because of their reported anti-inflammatory and immunomodulatory activities and their ability to influence multiple molecular mediators implicated in RA. This study proposes an *in silico* drug-discovery strategy to identify and optimize a flavone-based lead against key pro-inflammatory pathways involved in RA. A focused library of natural flavones and synthetically substituted flavone derivatives will be designed by systematically modifying the flavone scaffold to explore structure–activity relationships. Molecular docking will be performed against clinically relevant inflammatory targets, with tumour necrosis factor-alpha (TNF-α) selected as a primary target. Docking analysis will evaluate binding affinity, binding orientation, hydrogen-bonding interactions, hydrophobic contacts, and interactions with functionally important residues. Drug-likeness, physicochemical properties, ADME characteristics, and *in silico* toxicity will subsequently be evaluated to prioritize compounds with favourable pharmacokinetic and safety profiles. The proposed approach integrates target-based molecular docking, SAR analysis, ADME prediction, and toxicity screening to identify promising flavone scaffolds for subsequent biological validation.

Keywords*: Rheumatoid arthritis, tumour necrosis factor-alpha (TNF-α), flavone, ADME, in silico docking, anti-*

ISSN: 2584-2781

inflammatory activity.

INADDP/PC/ON/16

COMPUTATIONAL AND EXPERIMENTAL CHARACTERIZATION OF FATTY ACID METHYL ESTERS IN THERMALLY PROCESSED INDIAN RAPESEED OIL

Ravi Pratap[1,2], Ramesh Chandra Dubey[3], Rahul Kumar Maurya*[1]

[1]*Amity Institute of Pharmacy, Amity University Uttar Pradesh Lucknow Campus, Lucknow. 226028, India.*

[2]*Department of Pharmaceutical Sciences, Gurukul Kangri (Deemed to be University), Haridwar, Uttrakhand, 249404, India.*

[3]*Department of Botany and Microbiology, Gurukul Kangri (Deemed to be University), Haridwar, Uttrakhand, 249404, India.*

Corresponding Author:
rkmaurya@lko.amity.edu;
rahulkumarmaurya@gmail.com

Abstract:

This goal of the study was to find out how thermal oxidation affected Indian rapeseed oil's physicochemical characteristics and possible safety profile. The study's specific objectives were to assess changes in oil quality and specific biochemical parameters after thermal treatment, as well as to characterize the physicochemical and assay-interference properties of 14 fatty acid methyl esters (FAMEs) found by GC–FID in thermo-oxidized rapeseed oil. 14 FAMEs with short-, medium-, and long-chain saturated and unsaturated molecules were assessed using a structure-oriented in silico method. 123 predicted descriptors or endpoints that matched the ADMETlab 3.0 output framework were included in the analysis. Correlations between molecular weight, lipophilicity, solubility, hERG toxicity, and BBB-related factors were investigated, also physicochemical characteristics and ADMET-related data were examined. Physicochemical parameters, such as acid value, peroxide value, refractive index, p-anisidine value, iodine value, saponification value, specific gravity, and smoke point, were measured when Indian rapeseed oil was thermally treated at 180°C for 4 and 8 hours. The results show that the expected ADMET properties of FAMEs, specifically their lipophilicity and aqueous solubility, are influenced by carbon-chain length and degree of unsaturation. Additionally, thermal oxidation modifies the physicochemical characteristics of Indian rapeseed oil and is linked to modifications. In general, the computational predictions need more experimental validation and should be seen as supporting evidence.

ISSN: 2584-2781

This study may contribute to improved understanding of the safety implications associated with prolonged thermal exposure of edible oils and provide a basis for identifying potentially hazardous lipid-derived compounds.

Keywords: *Indian rapeseed oil; fatty acid methyl esters; thermal processing; ADMET; assay interference; computational toxicology.*

INADDP/PC/OF/19

ZINC OXIDE NANOPARTICLES IN PRECISION ONCOLOGY: MECHANISMS, THERAPEUTIC APPLICATIONS, SYNTHESIS STRATEGIES, AND TRANSLATIONAL PERSPECTIVES

Shambhavi Shandilya[1], Abhishek Tiwari*[1], Varsha Tiwari[1]

[1]*Amity institute of pharmacy, Amity University Uttar Pradesh, Lucknow Campus, 226028, Lucknow, Uttar Pradesh, India*

Corresponding author: *atiwari4@lko.amity.edu*

Abstract:

Cancer remains a major global health challenge, creating an urgent need for therapeutic strategies that improve tumor selectivity while minimizing systemic toxicity. Nanotechnology has emerged as a promising platform for precision oncology, and zinc oxide nanoparticles (ZnO NPs) have attracted considerable attention because of their unique physicochemical properties, biological reactivity, pH-responsive dissolution, and potential anticancer activity. This review provides a comprehensive overview of the emerging role of ZnO NPs in precision cancer therapy, with particular emphasis on their applications in breast cancer. The anticancer activity of ZnO NPs is primarily associated with enhanced cellular uptake, Zn^{2+} release, excessive reactive oxygen species generation, oxidative stress, mitochondrial dysfunction, DNA damage, cell-cycle arrest, and activation of apoptosis through pathways involving p53, Bax/Bcl-2, and caspases. ZnO NPs may also facilitate tumor-directed drug delivery through passive accumulation and can be engineered with targeting ligands to improve cellular specificity. The review further discusses physical, chemical, and green approaches for ZnO NP synthesis and highlights how synthesis conditions influence particle size, morphology, surface characteristics, stability, and biological performance. Particular attention is given to the opportunities and challenges associated with integrating ZnO NPs with conventional chemotherapy, targeted therapeutics, and other nanomedicine approaches. Despite promising preclinical findings, issues related to tumor

ISSN: 2584-2781

heterogeneity, biodistribution, dose-dependent toxicity, reproducibility, long-term safety, and clinical translation remain unresolved. Overall, ZnO NPs represent a promising multifunctional nanoplatform for precision oncology, but systematic mechanistic, toxicological, pharmacokinetic, and clinical studies are required to establish their therapeutic potential and facilitate translation into safe and effective cancer treatments.

Keywords- *Precision Oncology; Zinc Oxide Nanoparticles; pH-Responsive; Dissolution; Oxidative Stress; p53; Bax/Bcl-2.*

INADDP/PC/OF/20

DEMYSTIFYING THE CLINICAL BLACK BOX: A SYSTEMATIC REVIEW OF EXPLAINABLE AI (XAI) FRAMEWORKS IN PRECISION MEDICINE

Vaishnavi Kaushal[1], Upama Surendra Singh*[1]

Amity Institute of Pharmacy, Amity University Uttarpradesh , Lucknow Campus Lucknow-226028

Corresponding author: *ussingh@lko.amity.edu*

Abstract:

Precision medicine has reshaped healthcare by matching treatment to a patient's genetics, clinical background, environment, and lifestyle, and artificial intelligence has sharpened disease prediction, diagnosis, patient grouping, and treatment choices, yet many top models remain black boxes, accurate but opaque about how they reach an answer, and this opacity is a real barrier to clinical use since physicians need systems they can interpret and trust before relying on them for patient care; Explainable Artificial Intelligence (XAI) has emerged from this need, aiming to make algorithmic decisions transparent and clinically meaningful rather than statistically sound alone, and this systematic review examines current XAI approaches and their contribution to precision medicine, drawing on recent studies across oncology, cardiology, neurology, and rare genetic disorders, looking at explanation techniques now in common use, how they are built into machine learning and deep learning pipelines, and how well they perform on interpretability, clinician trust, regulatory compliance, and patient-centered decisions, while covering open problems such as the tradeoff between accuracy and interpretability, lack of agreed evaluation metrics, bias risks, data privacy, and practical hurdles to clinical adoption; the evidence points to XAI as essential for building AI systems in precision medicine that are transparent and ethically sound, not just accurate, and closing the gap

ISSN: 2584-2781

between performance and interpretability could strengthen clinician trust, support better decisions, and make AI safer to bring into personalized care, though standardized validation and closer collaboration across disciplines are still missing and both matter for bringing explainable AI into everyday clinical practice.

Keywords: *Explainable Artificial Intelligence (XAI), Precision Medicine, Artificial Intelligence, Machine Learning, Deep Learning, Clinical Decision Support*

INADDP/PC/OF/21

INTEGRATION CADD, AI AND PBPK MODELING IN DRUG DISCOVERY

Vaishnavi Raghuvanshi [1], Zeeshan Fatima[*1]

1.*Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, India 226028*

Email id*: zfatima@amity.edu*

Abstract:

Integrating computer-aided drug design (CADD), artificial intelligence (AI), and physiologically based pharmacokinetic (PBPK) modelling can build a complete end-to-end solution to predict drug behaviours from its molecular design through to clinical outcomes.Through machine learning (ML)the physicochemical properties can be predicted and further these can be utilized to have mechanistic Physiologically based pharmacokinetic (PBPK) modeling. These models help to describe and understand the flow of the respective compound within the compartment. Compartments are usually defined by grouping organs or tissues with similar blood perfusion rate and lipid content. It has been observed that through ML prediction we can obtain better result PBPK models serve as a bridge between diverse experimental data by converting individual experimental findings into mechanistic parameters and integrating them into a physiologically realistic model of drug disposition. They can used to predict efficacy or optimize the compound's properties. However, several inherent limitations present challenges to the development, validation, and application of PBPK models. These challenges include lack of diversity, insufficient data, model complexity, inter individual variability difficulty in *in vitro in vivo* extrapolation. Even though these limitations exist but still the PBPK mode has a strong regulatory history, for predicting drug-drug interactions. It is thus a need of hour to combine CADD, AI, and PBPK modeling to streamlined *in-silico* drug discovery process and reduce attrition of a new lead due to poor PK/PD performance in clinical trials.

ISSN: 2584-2781

Keywords: *Computer-Aided Drug Design (CADD), Artificial Intelligence (AI), Machine Learning (ML), Physiologically Based Pharmacokinetic (PBPK) Modelling, Pharmacokinetics (PK), Pharmacodynamics (PD)*

INADDP/PC/ON/17

IN-SILICO EVALUATION OF LACTAROVIOLIN ANALOGUES AS POTENTIAL PBP2A-TARGETING COMPOUNDS AGAINST METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS*

Yukti Nautiyal[1], Himanshu Rawal*[1], Vineet Kumar Maurya[1]

[1]*Applied Microbiology Laboratory, Department of Botany and Microbiology, Hemvati Nandan Garhwal University (A Central University), Srinagar Garhwal, Uttarakhand, 246174, India.*

Corresponding Author: *yuktinautiyal08@gmail.com*

Abstract:

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a major bacterial pathogen associated with resistance to β-lactam antibiotics, primarily mediated by penicillin-binding protein 2a (PBP2a). The present study evaluated twenty-two Lactaroviolin analogues as potential PBP2a-targeting compounds using an integrated *in-silico* approach involving ADMET profiling, molecular docking, interaction analysis, PASS prediction, and toxicity assessment. Molecular docking against PBP2a (PDB ID: 1MWT) showed binding scores ranging from −6.6 to −8.8 kcal/mol. C30 exhibited the strongest predicted binding (−8.8 kcal/mol), followed by C21 (−7.8 kcal/mol), C07 (−7.6 kcal/mol), and C06 (−7.5 kcal/mol), compared with penicillin G (−7.6 kcal/mol) and methicillin (−6.4 kcal/mol). C30 formed interactions with key PBP2a residues, including Tyr446 and Met641. PASS analysis predicted antibacterial and cell-wall-associated activities, with C39 showing the highest predicted antibacterial activity (Pa = 0.301) and C25 showing the highest predicted peptidoglycan glycosyltransferase inhibitory activity (Pa = 0.540). Toxicity prediction showed oral LD50 values ranging from 800 to 3570 mg/kg, with 15 compounds classified as toxicity class 4 and 7 as class 5. Five compounds C19, C26, C38, C17, and C44, showed no predicted carcinogenic, mutagenic, or neurotoxic effects. Based on the combined docking, PASS, and toxicity profiles, C19, C26, and C44 were prioritized as balanced computational candidates, whereas C30 represented the strongest docking hit but showed predicted carcinogenic and mutagenic liabilities. Overall, these findings highlight selected Lactaroviolin analogues as promising candidates for further experimental investigation against PBP2a and MRSA.

ISSN: 2584-2781

Keywords: *Methicillin-resistant Staphylococcus aureus (MRSA), Penicillin-binding protein 2a (PBP2a), Lactaroviolin analogues, Molecular docking, ADMET, Toxicity prediction*

INADDP/PC/OF/22

MUTATION-AWARE STRUCTURE-BASED DISCOVERY OF FLT3 INHIBITORS AGAINST RESISTANCE-ASSOCIATED VARIANTS IN ACUTE MYELOID LEUKAEMIA

Shipra Bajpai[1], Ruchi Yadav*[1]
Amity Institute of Biotechnology, Amity University, Lucknow Campus, Uttar Pradesh
Corresponding Author: *shipra.bajpai@s.amity.edu*

Abstract:

Acute myeloid leukaemia (AML) is a severe blood cancer, with mutations in the FLT3 gene linked to the abnormal growth of cells and treatment resistance. Despite the improved outcome of FLT3-mutated AML patients with FLT3 inhibitors, development of resistance is still a major challenge. The objective of this study is to explore the impact of resistance-associated FLT3 mutations on inhibitor binding and to find potential compounds that might sustain favourable interactions with various mutant forms of FLT3. FLT3 wild type and three clinically and experimentally characterized variants, F691L, D835Y and Y842C, that showed involvement in various mechanisms of resistance to inhibitors, will be investigated. The variants selected include important structural regions of the kinase domain including the gatekeeper residue and activation loop. Variant information will be collected and annotated using public genomic and bioinformatics resources. Structures of FLT3 will be obtained from the Protein Data Bank and mutant models will be generated and structurally assessed. First, a known FLT3 inhibitor will be used to perform molecular docking and to establish the docking protocol followed by comparative docking across wild-type and mutant structures. Then, virtual screening of public compound libraries will be performed to find potential inhibitors. Compounds will be ranked based on their predicted binding to a series of FLT3 variants, not only the wild-type FLT3. To identify the most promising candidates for the development of FLT3 inhibitors, a drug-likeness and pharmacokinetic analysis will also be conducted. This approach aims to provide insight into mutation-associated changes in FLT3 inhibitor binding and to identify potential mutation-resilient compounds for further investigation of AML.

ISSN: 2584-2781

***Keywords**: FLT3, Acute Myeloid Leukaemia, Drug Resistance, Molecular Docking, Virtual Screening*

INADDP/PC/OF/23

STRUCTURE-BASED EVALUATION OF NOVEL TEAD3 INHIBITORS TARGETING THE GLU347-ASSOCIATED SUBPOCKET FOR PRECISION CANCER THERAPY

Vaishnavi Shukla*, Ramanpreet Walia[1]
**Student, Master of Pharmacy, Pharmaceutical Chemistry, Amity University, Noida, -201313*
[1]Professor & Centre Head, Department of pharma chemistry, Amity University, Noida – 201313
***Corresponding Email:** vaishnavi.shukla9090@gmail.com*

Abstract:

The Hippo signaling pathway, through its downstream YAP/TAZ-TEAD transcription factor axis is critical in tumor cell proliferation. TEAD transcription factors contain a druggable lipid/palmitoylation-binding site which has become an area of great interest in precision oncology drug discovery. Recently, structural studies have identified additional, previously underexplored hydrogen bonding pocket located around Glu347 in TEAD3 which represents a novel sub-pocket for potential optimization of inhibitors against it. However, structure-based analyses of different classes of chemical inhibitors which bind this sub-pocket are scarce. This research intends to computationally analyze the binding characteristics of recently reported inhibitors of TEAD3 with special emphasis on their binding to the Glu347 sub-pocket in order to guide structure-based drug discovery for precision oncology applications. The human TEAD3 crystal structure (PDB 7CNL, co-crystallized with inhibitor VT-105) will be prepared and validated by performing redocking on the native ligand, followed by docking (Glide SP, with XP used for top-ranked candidates) of about 6-10 experimentally reported TEAD3 inhibitors, including those having similar structures to C-1 and C-2 (PDB 9IXS and 9IXT). Interactions of these inhibitors will be analyzed focusing especially on hydrogen bonding and hydrophobic interactions of the Glu347 sub-pocket, along with their biological activities to establish preliminary structure-activity relationships. Promising hits will be subjected to drug likeness and ADMET screening. Translational aspects will provide a nanotechnology-based strategy for drug delivery using PLGA-based or lipid-based nanoparticles.

***Keywords:** TEAD3, YAP/TAZ–TEAD axis, Hippo signalling pathway, Molecular docking, Structure-based drug design, Nanomedicine*

ISSN: 2584-2781

INADDP/PC/OF/24

DOE-ENABLED FORCED DEGRADATION AND STRESS MAPPING TO DEFINE A STABILITY-INDICATING DESIGN SPACE FOR AN API

Vineeta Rawat[1], *Aditya Soni*[1], *Neha Mathur*[1]*

[1]*Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, India 226028*

***Corresponding author**: nmathur1@amity.edu; neha07.mathur@gmail.com*

Abstract:

Pharmaceutical stability-indicating methods (SIMs) must be highly specific in the presence of relevant degradation products created under representative stress conditions. Traditional forced degradation studies, typically conducted on a one factor at a time basis, may give incomplete knowledge of interactions between stress factors and the limits of stress degradation onset. A Design of Experiments (DoE) driven framework for systematic forced degradation and stress mapping of an active pharmaceutical ingredient (API) is presented to aid in the development of a scientifically sound stability indicating design space. The critical stress factors that affect degradation extent and degradant profiles were identified by a screening DoE (fractional factorial or Plackett–Burman design) involving pH, temperature, oxidant concentration, humidity and light exposure. The significant factors were then studied using response surface methodology (RSM) using a Central Composite design or Box–Behnken design. The key responses were percentage assay loss, formation of degradation products and mass balance, which were measured by HPLC-PDA/UPLC-MS; the relationships between stress factor combinations and degradation responses were established using multivariate regression and analysis of variance (ANOVA). This stress mapping allowed the identification of degradation prone areas, critical factor interactions, and degradation thresholds, which led to the definition of a scientifically supported design space for API handling, processing and storage. The DoE driven strategy offers better resolution of multidimensional stress effects than traditional univariated testing and enables the development of understanding of the degradation pathways in a systematic way, stability indicating methods, and risk-based control strategies. This framework follows the principles of Quality by Design (QbD) and the science and risk-based approach recommended by ICH Q1, Q2 and Q14.

***Keyword**: Forced degradation, Design of experiments, stability-indicating method,*

ISSN: 2584-2781

stress mapping, Design space, Degradation kinetics, Quality by Design, API.

Miscellaneous Abstracts

INDEX

S.No.	CODE	Authors	Topic	Page No.
242.	**INADDP/M-1**	Daniyal Khan, Rufaida Wasim*	AI-DRIVEN NANOMEDICINE FOR TARGETED DRUG DELIVERY IN COGNITIVE IMPAIRMENT: TOWARD PRECISION THERAPEUTICS	227
243.	**INADDP/M-2**	Mr. Bhaskar*	A REVIEW ON PHARMACOLOGICAL ACTIVITIES OF BRYOPHYLLUM PINNATUM. LINN.	227
244.	**INADDP/M-3**	Karan Kumar and Dr. Lakshmi*	LIPID NANOPARTICLES FOR MRNA DELIVERY: ADVANCES AND CHALLENGES AFTER COVID-19	228
245.	**INADDP/M-4**	Neelima Shrivastava	PRIVILEGED HETEROCYCLIC SCAFFOLDS IN NEXT-GENERATION ANTICANCER DRUG DISCOVERY: FROM RATIONAL DESIGN TO PRECISION THERAPEUTICS	229
246.	**INADDP/M-5**	Satarudra Prakash Singh* and Puja Jaishwal	COMPUTER-AIDED DESIGNING OF UNIVERSAL NANOVACCINE AGAINST COVID-19	229
247.	**INADDP/M-6**	Nikita yadav	FORMULATION AND EVALUATION OF NANOEMULSION BASED IN-SITU NASAL GEL	230
248.	**INADDP/M-7**	Ms. Marjita Chakma1, Dr. Anindita De1*	BIOINSPIRED MICRONEEDLE SYSTEMS FOR PEPTIDE DELIVERY: FROM INNOVATIVE DESIGN TO CLINICAL TRANSLATION	231
249.	**INADDP/M-8**	Atithi Singh1, Kapil Kumar Gupta2	CRISPR NANOCARRIERS USING DNA ORIGAMI DESIGN FOR CHRONOMEDICATION OF CHEMORESISTANT	232
250.	**INADDP/M-9**	Satish Kumar Kushwaha [1], Dr Virendra Kumar Maurya[2]*, Mr Kamlesh Kumar[3]	EVALUATION OF THE HEPATOPROTECTIVE AND ANTIOXIDANT POTENTIAL OF BAUHINIA VARIEGATA FLOWER EXTRACT AGAINST EXPERIMENTALLY INDUCED HEPATOTOXICITY	233
251.	**INADDP/M-10**	Aditya Kumar Yadav*, Dr. Shradhanjali Singh*, Dr. Anil Kumar Singh	EMERGING NANOPARTICLES SYSTEM FOR THE TARGETED TREATMENT OF RHEUMATOID ARTHRITIS	234
252.	**INADDP/M-11**	Ankit Prajapati, Dr. Uma Shanker Maurya*	DIGITAL TWIN-DRIVEN PRECISION NANOMEDICINE: AN INTEGRATED AI & MOLECULAR DOCKING FRAMEWORK FOR PERSONALIZED CANCER THERAPY	235
253.	**INADDP/M-12**	Balwant Sahani*, Dr. Shradhanjali Singh*, Dr. Anil Kumar Singh	NANOTECHNOLOGY-BASED STRATEGIES FOR ENHANCING THE BIOAVAILABILITY AND THERAPEUTIC EFFICACY OF ANTI-INFLAMMATORY DRUGS	235
254.	**INADDP/M-13**	Archana Reddy*	IN SILICO REPURPOSING OF ANTIFUNGAL AZOLES TARGETING CYP5122A1 AGAINST LEISHMANIA MAJOR IN CUTANEOUS LEISHMANIASIS	236
255.	**INADDP/M-14**	Vandana Pal	NANOPARTICLES FOR CANCER DRUG DELIVERY: IMPROVING THERAPEUTIC EFFICACY	237

256.	**INADDP/M-15**	Sahil Saini*, Ramanpreet walia	INNOVATING THERAPEUTICS THROUGH NATURAL PRODUCTS, COMPUTATIONAL CHEMISTRY AND PRECISION DRUG DESIGN	237
257.	**INADDP/M-16**	Janhvi Pandey1, Kapil Kumar Gupta2	LEARNING ANALYTICS TO PREDICT LEARNER PERFORMANCE IN EARLY CHILDHOOD EDUCATION	238
258.	**INADDP/M-17**	Rishabh Singh, Pallavi Tiwari*	NANOMEDICINE IN DIABETIC NEPHROPATHY: FROM DRUG DELIVERY TO KIDNEY PROTECTION	239
259.	**INADDP/M-18**	Vipin Tiwari [1], Md Kaish [1], Divyash Singh[1]	CART CELL THERAPY - A REVOLUTIONARY APPROACH FOR jiMALIGNANCY	240
260.	**INADDP/M-19**	Ayushi Agrawal1, Abhishek Nandy1, Nidhi Rai1,2, Manodeep Sen2 Aditi Singh1*	ISOLATION AND COMPREHENSIVE CHARACTERISATION OF ΦECODURGA, A NOVEL LYTIC COLIPHAGE TARGETING ANTIMICROBIAL-RESISTANT UROPATHOGENIC ESCHERICHIA COLI	241
261.	**INADDP/M-20**	Altaf Husen, Nishi Gupta	NEXT-GENERATION ANTI-ULCER THRAPEUTICS: A CRITICAL REVIEW OF SULPHONAMIDE DERIVATIVES	242
262.	**INADDP/M-21**	Ritwika Jaiswal, Amit Kumar Mishra*	NEXT-GENERATION FERULIC ACID DERIVATIVES FOR DIABETIC WOUND HEALING: FROM MOLECULAR DESIGN TO PROPOSED NANOTECHNOLOGY-BASED DELIVERY	243
263.	**INADDP/M-22**	Anurag Singh, Diya Nigam, Prachi Srivastava and Shilpi Srivastava*	ANTIMICROBIAL EFFICACY OF METAL NANOPARTICLES VERSUS CONVENTIONAL ANTIBIOTICS AGAINST ESCHERICHIA COLI	244
264.	**INADDP/M-23**	Aransha Maurya1,2, Suyashi Mishra1, Uma Shankar1, Akshita Chakravarty1, Shivani Sahu1, Vaishali Sahu1, Sudeep Tandon1,2, Ram Swaroop Verma1,2,*	LALLEMANTIA ROYLEANA: A NATURAL PLATFORM FOR NEXT-GENERATION THERAPEUTICS	245
265.	**INADDP/M-24**	Diya Nigam, Anurag Singh, Prachi Srivastava and Shilpi Srivastava*	SCREENING OF POTENTIAL METAL NANOPARTICLES AS ANTIMICROBIALS AGAINST S. AUREUS	246
266.	**INADDP/M-25**	Shefali Madaan Kathuria*1, Shivang Shukla1	NANO-ENABLED GENE EDITING PLATFORMS: CRISPR DELIVERY FOR NEXT-GENERATION THERAPEUTICS	247
267.	**INADDP/M-26**	Dr Neelima Shrivastava1	PRIVILEGED HETEROCYCLIC SCAFFOLDS IN NEXT-GENERATION ANTICANCER DRUG DISCOVERY: FROM RATIONAL DESIGN TO PRECISION THERAPEUTICS	248
268.	**INADDP/M-27**	Surbhi S. Chavhan	DEVELOPMENT AND EVALUATION OF ALMOND OIL-LOADED NANOLIPOSOMES FOR INTRANASAL DELIVERY IN ALZHEIMER'S DISEASE	248
269.	**INADDP/M-28**	Neelam Maurya, Dr. Shanti Bhushan Mishra*	PROBIOTIC-FERMENTED PLANT BIO-ACTIVES AND THEIR NANO-FORMULATION: A NOVEL APPROACH FOR DIABETES	249

			MANAGEMENT	
270.	**INADDP/M-29**	Harsh Kumar*, Dr. Sunil Kumar Singh*	ADVANCEMENT IN DRUG DELIVERY TO THE BRAIN FOR NEUROPROTECTIVE MANAGEMENT	250
271.	**INADDP/M-30**	Diptee Gupta*, Shashank Soni	BEYOND CONVENTIONAL ELECTROSPINNING: ADVANCED NANOFIBER ARCHITECTURES FOR CONTROLLED AND PROGRAMMABLE DRUG DELIVERY	251
272.	**INADDP/M-31**	Komal Dixit 2, Satyam Sharma1,2	METABOLITE PROFILING AND THERAPEUTIC EVALUATION OF RUDRAKSHA (ELAEOCARPUS GANITRUS) AGAINST HYPERTENSION AND DEMENTIA: AN LC-HRMS APPROACH	252
273.	**INADDP/M-32**	Dhvani Rafaliya*1, Aditya Singh 2	ENHANCING THERAPEUTIC POTENTIAL OF PHYTOCHEMICALS THROUGH NANOSTRUCTURE LIPID CARRIER-BASED DELIVERY	253
274.	**INADDP/M-33**	Muskan Kushwaha	FROM PHYTOCHEMICAL DISCOVERY TO NANO-THERAPEUTICS: EXPLORING MICHELIA CHAMPACA LINN. FOR NEXT-GENERATION BURN WOUND HEALING	254
275.	**INADDP/M-34**	Sushil Prajapati	NEXT-GEN CANCER THERAPY: THE CONVERGENCE OF ARTIFICIAL INTELLIGENCE, NANOTECHNOLOGY, AND DIGITAL TWIN.	255
276.	**INADDP/M-35**	Afroj Alam and Dr. Snigdha Bhardwaj*	INSIGHT OF TOPICAL LIPOSOMAL DRUG DELIVERY SYSTEM FOR THE MANAGEMENT OF SURFACE BACTERIAL INFECTIONS.	256
277.	**INADDP/M-36**	Aarzu Tripathi*, Rudra Pratap Singh	DIGITAL-TWIN–GUIDED ORGAN-ON-A-CHIP PLATFORMS FOR PERSONALIZED NANOTHERAPEUTIC DISCOVERY: BRIDGING THE SILICON–CARBON DIVIDE	256
278.	**INADDP/M-37**	Dr. Prashant Kumar Desai*	HERBAL IMMUNOMODULATORS: FORMULATION, CHARACTERIZATION AND THERAPEUTIC POTENTIAL	257
279.	**INADDP/M-38**	Abishek Tripathi1, Neeraj Jain*1	TRACING THE DEVELOPMENT OF GLAUCOMA RESEARCH: A SCIENTOMETRIC STUDY	258
280.	**INADDP/M-39**	Dr. Renu Solanki	NANO-ENABLED THERAPEUTICS: EMERGING PLATFORMS FOR EFFECTIVE AND TARGETED DRUG DELIVERY	259
281.	**INADDP/M-40**	Ravi Pratap1,2, Ramesh Chandra Dubey3, Rahul Kumar Maurya*1	COMPUTATIONAL AND EXPERIMENTAL CHARACTERIZATION OF FATTY ACID METHYL ESTERS IN THERMALLY PROCESSED INDIAN RAPESEED OIL	260
282.	**INADDP/M-41**	Kirti	NANOTECHNOLOGY-BASED DRUG DELIVERY SYSTEMS: ADVANCES, THERAPEUTIC APPLICATIONS AND SAFETY CONSIDERATIONS	261
283.	**INADDP/M-42**	Nidhi Yadav1, Md Kaish1* Divyash Singh1	ORGANOID-ON-A-CHIP AND NANOTECHNOLOGY: AN EMERGING PLATFORM FOR NEXT-GENERATION DRUG DISCOVERY	262
284.	**INADDP/M-43**	Piyush Gupta1, Md Kaish1* Divyash Singh1	AI-DRIVEN NANOTECHNOLOGY FOR PERSONALIZED CANCER THERAPY: FROM NANOCARRIER DESIGN TO PRECISION TREATMENT	263

285.	**INADDP/M-44**	Ayushi Singh*, Abhishek Nandy	EVALUATION OF INDIAN MEDICINAL HERBS AND THEIR COMBINATIONS AGAINST UROPATHOGENIC ESCHERICHIA COLI: AN IN VITRO ANTIMICROBIAL STUDY	264
286.	**INADDP/M-45**	Abhinav Verma*, Shashank Soni	USE OF HYDROGELS LOADED WITH HYDROGELS FOR DIABETIC WOUND HEALING	265
287.	**INADDP/M-46**	Yash kesarwani, Amit Kumar Singh*	NANOTECHNOLOGY-ENABLED TOPICAL DELIVERY OF TERBINAFINE FOR THE MANAGEMENT OF DERMATOPHYTIC INFECTIONS: RECENT ADVANCES AND FUTURE PERSPECTIVES	265
288.	**INADDP/M-47**	Khushi Gupta khushigp900@gmail.com	BILARYER AND MULTILAYER TABLET: ADVANCES IN MODIFIED DRUG RELEASE	266
289.	**INADDP/M-48**	Rudra Pratap Singh*, Aarzu Tripathi	ARTIFICIAL INTELLIGENCE-GUIDED LIPID NANOPARTICLES: A NEXT-GENERATION PLATFORM FOR PRECISION DRUG DELIVERY	267

ISSN: 2584-2781

INADDP/M-1

AI-DRIVEN NANOMEDICINE FOR TARGETED DRUG DELIVERY IN COGNITIVE IMPAIRMENT: TOWARD PRECISION THERAPEUTICS

Daniyal Khan, Rufaida Wasim*
Faculty of Pharmacy, Integral University, Lucknow (U.P.), India.
***Email Id**:*
danIyalkhan.pharma@gmail.com

Abstract:

Cognitive impairment associated with neurodegenerative disorders remains a major therapeutic challenge, partly because effective delivery of pharmacological agents to the brain is restricted by the blood–brain barrier (BBB). Conventional drug delivery approaches often face limitations in achieving adequate brain exposure while minimizing systemic and off-target effects. The integration of artificial intelligence (AI), particularly machine learning and deep learning, with nanomedicine offers an emerging strategy for optimizing nanocarrier design, predicting formulation characteristics, identifying therapeutic targets, and facilitating targeted drug delivery. This review explores recent advances in AI-driven nanomedicine for cognitive impairment, with emphasis on integrating computational approaches with advanced nanocarrier systems for BBB targeting and brain-specific drug delivery. Applications of AI in drug–nanoparticle interaction prediction, nanocarrier optimization, target identification, and prediction of delivery characteristics are discussed alongside lipid-based, polymeric, and other advanced nanomedicine platforms. Particular emphasis is placed on emerging strategies for improving CNS drug delivery in Alzheimer's disease and other neurodegenerative conditions associated with cognitive dysfunction. Despite considerable promise, challenges including limited high-quality datasets, model validation, reproducibility, nanomedicine safety, BBB translation, and regulatory requirements remain important barriers to clinical implementation. Overall, AI-driven nanomedicine represents a promising convergence of computational approaches and precision drug delivery, with the potential to facilitate more targeted therapeutic strategies for cognitive impairment.

***Keywords**: Artificial intelligence, nanomedicine, cognitive impairment, blood–brain barrier, targeted drug delivery, precision therapeutics.*

INADDP/M-2

A REVIEW ON PHARMACOLOGICAL ACTIVITIES OF *BRYOPHYLLUM PINNATUM.* LINN.

ISSN: 2584-2781

*Mr. Bhaskar**
Madhyanchal Professional University, Ratibad, Bhopal, M.P.
Email Id: *bhaskarkumar7676@gmail.com*

Abstract:

Bryophyllum pinnatum is one of the important and most commonly used plant belongs to the family crassularaceae. This plant is mainly used as a tropical medicinal plant in India, America and other countries. The presence of various chemical constituents in this plant can be used as a medicine for various diseases. The important chemical constituents present in the plant include alkaloids, triterpenes, flavonoids, lipids, glycosides, phenols, bufadienolides, and organic acids. Due to the presence of these chemical constituents *Bryophyllum pinnatum* shows various pharmacological activities like, nephroprotective, antioxidant, analgesic, anti-diabetic, antimicrobial, anticonvulsant antipyretic, and neuropharmacological activity. This review covers various pharmacological activities of the plant *Bryophyllum pinnatum.*

Keywords: *Bryophyllum pinnatum, Plant, glycosides, leaves.*

INADDP/M-3

LIPID NANOPARTICLES FOR MRNA DELIVERY: ADVANCES AND CHALLENGES AFTER COVID-19

Karan Kumar and Dr. Lakshmi*
K.I.E.T SCHOOL OF PHARMACY, Delhi- NCR, Ghaziabad-Meerut Road, Ghaziabad-201206, Uttar Pradesh, India.
K.I.E.T SCHOOL OF PHARMACY, Delhi- NCR, Ghaziabad-Meerut Road, Ghaziabad-201206, Uttar Pradesh, India, lakshmi.ksop@kiet.edu.
Email Id: *shahikaran42@gmail.com*

Abstract:

Although messenger RNA (mRNA) delivery techniques have shown a good potential in treating a wide range of diseases and illness, their practical usage is hindered by delivery problems and intrinsic instability. As they offer an effective protection against degradation and allow efficient cellular uptake and endosomal escape, lipid nanoparticles (LNPs) have emerged as the backbone of mRNA delivery systems. This platform has been verified and, innovations and new developments in design of lipid, site specific delivery, and formulation stability have fast-tracked as a result of rapid development and extensive success of LNP-based mRNA vaccines during the phase of COVID-19 pandemic. In spite of huge progressions and advancements, problems like toxicity, delivery efficiency, large-scale production, and regulatory hurdles still prevail. This review emphasizes the basic and most critical role of lipid nanoparticles in the emerging area of RNA therapeutics by discussing and explaining the most important developments and advancements in LNP

ISSN: 2584-2781

technology following COVID-19, examining and analysing current and on-going barriers, and highlighting future potential and aspects such as personalised mRNA treatments and next-generation nanocarriers**.**

Keywords: *mRNA therapeutics, Lipid nanoparticles, Drug delivery system, COVID-19 vaccines, Targeted delivery, regulatory challenges.*

INADDP/M-4

PRIVILEGED HETEROCYCLIC SCAFFOLDS IN NEXT-GENERATION ANTICANCER DRUG DISCOVERY: FROM RATIONAL DESIGN TO PRECISION THERAPEUTICS

Neelima Shrivastava
JSS University, Noida
Email Id: *neelimashrivastava14@gmail.com*

Abstract:

Cancer remains a major health challenge, and the development of effective and selective anticancer drugs is an important goal of medicinal chemistry. Heterocyclic scaffolds are widely used in drug discovery because of their structural diversity, favourable binding properties, and ability to interact with different biological targets. This review highlights the importance of privileged heterocyclic scaffolds in the development of next-generation anticancer agents, with emphasis on quinoline, quinazoline, indole, benzimidazole, pyrazole, thiazole, and oxadiazole derivatives. Recent strategies such as molecular hybridization, scaffold modification, and structure–activity relationship studies are discussed for improving potency and selectivity. The role of computer-aided drug-design approaches, including molecular docking, virtual screening, ADMET prediction, and molecular dynamics simulation, in the identification and optimization of promising heterocyclic leads is also highlighted. In addition, the integration of heterocyclic drug design with precision medicine and nanotechnology-based targeted delivery may provide new opportunities to improve therapeutic efficacy and reduce unwanted effects. Overall, privileged heterocyclic scaffolds provide a versatile platform for designing innovative anticancer agents and, when combined with advanced drug-discovery technologies, may contribute to the development of more selective and effective cancer therapies.

Keywords: *Heterocyclic scaffolds, Anticancer agents, Medicinal chemistry, Molecular hybridization, Computer-aided drug design, Precision medicine*

INADDP/M-5

COMPUTER-AIDED DESIGNING OF UNIVERSAL NANOVACCINE AGAINST COVID-19

ISSN: 2584-2781

*Satarudra Prakash Singh** and Puja Jaishwal
Department of Biotechnology, Mahatma Gandhi Central University, Motihari 845401, India.
* ***Email Id:*** sprakashsingh@mgcub.ac.in

Abstract:

The continuous evolution of the SARS-CoV-2 virus, marked by the emergence of new variants, poses a significant threat to the efficacy of existing vaccines. However, a promising approach to address vaccine failure caused by viral mutations (particularly in the spike protein) is the development of a variant-proof (conserved), non-spike, multiepitope universal nanostructured vaccine with multifunctionality, biocompatibility, self-adjuvanticity, and structural similarity to pathogens in size and shape. This study developed a self-assembled nanostructured vaccine (SANV) featuring pentameric and trimeric coiled-coil peptide motifs, epitopes, and an adjuvant. The epitopes of SANV were screened from the IEDB database for those with more than 50% individual predicted population coverage (PPC). The multimerization of the SANV monomers was modeled using the GalaxyHomomer and AlphaFold web servers. Subsequently, the leading SANV constructs with (SANVa9) and without (SANVb6) adjuvant were analyzed for molecular interactions, specificity, and stability with the broadly neutralizing sarbecovirus antibody 5817 and toll-like receptors (TLR2, TLR3, and TLR7) using molecular docking and simulations over 100 ns. Finally, the comparative immune simulation profiles of SANVa9 and SANVb6 with existing vaccines indicated stronger, broad-spectrum immune responses. However, further in vitro and in vivo studies are warranted before clinical use.

Key Words: *SARS-CoV-2, COVID-19, epitope, bioinformatics, nanovaccine.*

INADDP/M-6

FORMULATION AND EVALUATION OF NANOEMULSION BASED *IN-SITU* NASAL GEL

Nikita yadav
Email Id: nikitaji533@gmail.com

Abstract:

Clear mixtures of water, co-surfactant, surfactant, and oil are known as nanoemulsions. These include oil-in-water emulsions and the diameter of droplets ranges between 5 -200 nm. Nanoemulsions were the translucent dispersions of water & oil which are thermodynamically stable and maintained through an interfacial coating of co-surfactants & surfactants. This paper briefly outlines the process of production and testing of nanoemulsion like a drugs carrier to improve delivery of therapeutic drugs. The intention of this researchs are to plan & trial nanoemulsions (NEs) as *in-*

ISSN: 2584-2781

situ nasal gel of phenytoin as nanoemulsions based to be delivered nasally to achieve bioavailability enhancement in the context of ment. Solubility of phenytoin was firstly studied in various oils, surfactant and co. surfactant and later, pseudternary phase diagrams were also plotted to choose the best proportion of oils, surfactants & co-surfactants. Cleared & transparenting NE formulations characteristic was droplet size, viscosity, solubilization, transmission electron microscopy, in-vitro drug release and compatibilities tests. Polymers; HPMC K15M or HPMCK9M NE-based gels were tested to gelate. temperature, viscosity, spreadability and stability. The NE based *in-situ* gels were also chosen and tested, ex-vivo permeation. cinnamon oil, tween 20 and isopropyl alcohol were chosen to be used in NE preparation since this is the most solubilized. NE based gels could be an intriguing dosages form to brain delivery as a newly drug delivery systems since they survived a dispersibility/ stability test.

INADDP/M-7

BIOINSPIRED MICRONEEDLE SYSTEMS FOR PEPTIDE DELIVERY: FROM INNOVATIVE DESIGN TO CLINICAL TRANSLATION

Ms. Marjita Chakma1, Dr. Anindita De1*

1.Department of Pharmaceutics, College of Pharmacy, JSS University, Noida, Uttar Pradesh

Email id: *marjitachakma777@gmail.com*

Abstract:

Peptide-based therapies have transformed the management of chronic illnesses such as diabetes, cancer, and cardiovascular problems, owing to their remarkable specificity, effectiveness, and little toxicity. Nonetheless, their therapeutic efficacy is frequently impeded by obstacles such as inadequate bioavailability, fast enzymatic breakdown, and restricted systemic stability. Conventional delivery strategies, such as oral and intravenous injection, have considerable constraints in efficiently transporting peptides to target locations. Transdermal drug delivery system, especially microneedles (MNs) and bioinspired microneedle (BMNs) have garnered considerable interest as a less invasive and effective option to surmount these obstacles. MNs form microchannels in the dermis, facilitating the direct administration of peptides into systemic circulation, hence improving patient adherence and reducing adverse effects. Recent improvements in BMNs technology have enhanced peptide delivery through better mechanical strength, controlled release, and biocompatibility. This work mainly focuses on the importance of peptide medicines, the obstacles related to their administration, and the potential of BMNs

ISSN: 2584-2781

as an effective transdermal method. We emphasize current advancements in BMNs that improve peptide stability, permeability, and therapeutic effectiveness, facilitating their practical use in the treatment of chronic and acute disorders.

Keywords: *Peptides, Microneedle, Bioinspired microneedle, Bio mimic, Transdermal.*

INADDP/M-8

CRISPR NANOCARRIERS USING DNA ORIGAMI DESIGN FOR CHRONOMEDICATION OF CHEMORESISTANT

Atithi Singh1, Kapil Kumar Gupta2
1,2 Amity University Uttar Pradesh, Lucknow Campus, INDIA
Email Id: *atithisingh.dev@gmail.com*

Abstract:

Resistance to chemotherapy remains one of the toughest challenges in cancer treatment, which is usually due to several reasons such as tumor heterogeneity, excessive expression of efflux drug pumps, and constant DNA repair activity. Thus, this study suggests the use of chronomodulated and geneedited nanocarrier designed using artificial intelligence (AI)-assisted DNA origami to overcome resistance to chemotherapy and make chemoresistant tumors susceptible to drugs.

Machine learning was used to design the architecture of the origami nanostructure, which is optimized for maximum drug loading and stability in serum as well as favorable shape for penetration in tumor tissues. The nanocarrier includes pH- and redox-sensitive linkers, and delivers both doxorubicin and gene-editing ribonucleoprotein, which will target the transcription of two key genes encoding protein efflux pump and DNA repair activity. The novelty of this system is based on chronotherapy which allows to synchronize drug release with the circadian cycle of the tumor to take advantage of the window when efflux pumps and repair enzymes activity reaches its lowest. Design of the system was assessed using methods of molecular docking and simulation, as well as in silico pharmacokinetics which helped to predict binding activity, release and accumulation of the drug in tumor tissue. Expected results are reduction of transcription of both genes which are responsible for resistance; restoration of tumor sensitivity to the drug, tumor apoptosis and low toxicity compared to liposomes. Thus, this design combines the advantages of structural DNA nanotechnology, artificial intelligence, chronotherapy, and precise CRISPR-mediated medicine in the form of programmable therapeutic platform in order to develop an effective approach to the personalized therapy of refractory tumors.

Keywords*: DNA origami, CRISPR-Cas9, chronomodulated delivery,*

ISSN: 2584-2781

chemoresistance, doxorubicin, circadian rhythm, personalized nanomedicine, artificial intelligence.

INADDP/M-9

EVALUATION OF THE HEPATOPROTECTIVE AND ANTIOXIDANT POTENTIAL OF *BAUHINIA VARIEGATA* FLOWER EXTRACT AGAINST EXPERIMENTALLY INDUCED HEPATOTOXICITY

Satish Kumar Kushwaha[1], Dr Virendra Kumar Maurya[2]*, Mr Kamlesh Kumar[3]
[1]*Department of Pharmacology, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*
[2]*Department of Pharmaceutical Chemistry, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*
[3]*Department of Pharmacognosy, Smt Fulhera Smarak College of Pharmacy, Kamtaila, Rasra, Ballia, Uttar Pradesh – 221712, India*
[1]Email Id: *satishkumark452@gmail.com*

Abstract:

Hepatotoxicity is a major health concern characterized by hepatic injury, oxidative stress, and impairment of normal liver function. *Bauhinia variegata* is a medicinal plant traditionally recognized for its diverse pharmacological properties and the presence of bioactive phytoconstituents with potential antioxidant activity. The present study was undertaken to evaluate the hepatoprotective and antioxidant potential of *Bauhinia variegata* flower extract against experimentally induced hepatotoxicity. Authenticated flowers of *B. variegata* were collected, dried, powdered, and extracted using a suitable extraction procedure. Preliminary phytochemical screening was performed to identify the major classes of phytoconstituents present in the extract. The antioxidant potential was evaluated using appropriate in-vitro antioxidant assays, while hepatoprotective activity was assessed in an experimental model of hepatotoxicity by evaluating liver function parameters, oxidative stress markers, and other relevant biochemical parameters. The extract showed the presence of several important phytochemical constituents and demonstrated appreciable antioxidant activity. Treatment with the flower extract exhibited a protective effect against experimentally induced hepatic injury, as indicated by improvement in relevant biochemical parameters compared with the toxicant control group. The observed hepatoprotective effect may be associated with the antioxidant properties of the extract and its ability to attenuate oxidative damage in hepatic tissue. The findings suggest that *B variegata* flower extract possesses promising hepatoprotective and antioxidant potential and warrants further investigation as a possible natural source of

ISSN: 2584-2781

hepatoprotective agents.

Keywords: *Bauhinia variegata, Hepatoprotective, Antioxidant, Hepatotoxicity, Oxidative stress, Phytochemicals.*

INADDP/M-10

EMERGING NANOPARTICLES SYSTEM FOR THE TARGETED TREATMENT OF RHEUMATOID ARTHRITIS

*Aditya Kumar Yadav**, Dr. Shradhanjali Singh*, Dr. Anil Kumar Singh
United institute of pharmacy, UCER A-31/1, UPSIDC Industrial area, Naini, Prayagraj - 211010
Email Id: *- adityayadav5886@gmail.com*

Abstract:

Rheumatoid arthritis (RA) is a chronic autoimmune disease that mainly affects the joints and causes pain, swelling, stiffness, and progressive joint damage. Conventional medicines are effective in controlling RA, but their long-term use may cause systemic side effects and other limitations. Therefore, there is a growing need for safer and more targeted drug delivery approaches. Emerging nanoparticle-based systems have gained considerable attention because they can improve drug solubility, stability, bioavailability, and controlled release. Nanoparticles can also help deliver therapeutic agents directly to inflamed joints, which may increase treatment effectiveness and reduce exposure to healthy tissues. Various nanoparticle systems, including liposomes, solid lipid nanoparticles (SLNs), nanostructured lipid carriers (NLCs), polymeric nanoparticles, nanoemulsions, micelles, dendrimers, and inorganic nanoparticles, are being explored for the treatment of RA. These systems can carry synthetic drugs, natural compounds, proteins, peptides, and other therapeutic agents. Targeted nanoparticles may use specific ligands, antibodies, peptides, or inflammation-responsive materials to improve accumulation at the site of inflammation. In addition, nanoparticles can provide sustained and controlled drug release, which may reduce dosing frequency and improve patient compliance.

Plant-derived bioactive compounds incorporated into nanoparticles may also provide antioxidant and anti-inflammatory benefits with improved delivery. Overall, emerging nanoparticle systems represent a promising approach for targeted and effective RA treatment. However, further studies are required to evaluate their safety, stability, therapeutic effectiveness, scalability, and clinical applicability before routine clinical use.

Keywords*: Rheumatoid arthritis, Nanoparticles, Targeted drug delivery, Nanomedicine, NLC, Liposomes.*

ISSN: 2584-2781

INADDP/M-11

DIGITAL TWIN-DRIVEN PRECISION NANOMEDICINE: AN INTEGRATED AI & MOLECULAR DOCKING FRAMEWORK FOR PERSONALIZED CANCER THERAPY

Ankit Prajapati, Dr. Uma Shanker Maurya*
Goel Institute of Pharmacy & Sciences (GIPS), Lucknow, Uttar Pradesh, India.

Abstract:

The main drawbacks of classical cancer chemotherapy include the lack of specificity in the delivery of the therapeutic agents, drug resistance, and side effects on various organs and tissues. Moreover, the development of targeted nanoparticles using traditional research methods is labor-intensive and takes a lot of time. To solve this problem, this literature review discusses a new approach to the design of next-generation targeted nanomedicines, which is based on the combination of digital twin technologies, artificial intelligence (AI), and molecular docking. By applying these tools, it is possible to assess the affinity of molecules and design nanoparticle surface modifications prior to their formulation and testing. The development of "Digital Twins" – dynamic, computer-based models of patient-specific tumor microenvironments – will allow simulating the bio distribution, immune clearance, and drug delivery process. Multi-scale modeling will eliminate unpredictable experiments with nanoparticles and make it possible to optimize them in the virtual world for the maximal intratumoral accumulation and minimal harm to normal tissues.

Keywords: *Digital Twin, Molecular Docking, Artificial intelligence, Nanomedicines, Cancer, Targeted drug delivery.*

INADDP/M-12

NANOTECHNOLOGY-BASED STRATEGIES FOR ENHANCING THE BIOAVAILABILITY AND THERAPEUTIC EFFICACY OF ANTI-INFLAMMATORY DRUGS

*Balwant Sahani**, Dr. Shradhanjali Singh*, Dr. Anil Kumar Singh
United Institute of Pharmacy, UCER A-31/1, UPSIDC Industrial area, Naini, Prayagraj - 211010
Email- *balwantsahani666@gmail.com*

Abstract:

Inflammation is a natural protective response of the body, but prolonged or excessive inflammation can lead to diseases such as rheumatoid arthritis, osteoarthritis, and inflammatory bowel disease. Anti-inflammatory drugs such as diclofenac, ibuprofen, naproxen, and celecoxib are commonly used for treatment. However, many of these drugs

ISSN: 2584-2781

have limitations such as poor water solubility, low bioavailability, rapid elimination, and unwanted side effects. Nanotechnology-based drug delivery systems provide a promising approach to overcome these problems. Nanocarriers such as nanoparticles, nanocrystals, liposomes, nanoemulsions, solid lipid nanoparticles (SLNs), and nanostructured lipid carriers (NLCs) can improve the solubility, stability, dissolution, and absorption of anti-inflammatory drugs. Their small size and modifiable surface properties can also support controlled and targeted drug delivery to inflamed tissues. This may increase drug concentration at the desired site, improve therapeutic efficacy, and reduce systemic toxicity. Recent advances in nanotechnology have therefore opened new possibilities for developing safer and more effective anti-inflammatory therapies. Overall, nanotechnology represents a promising strategy for improving the bioavailability and therapeutic performance of conventional anti-inflammatory drugs.

Keywords: *Nanotechnology, Anti-inflammatory drugs, Nanoparticles, Bioavailability, Drug delivery system.*

INADDP/M-13

IN SILICO REPURPOSING OF ANTIFUNGAL AZOLES TARGETING CYP5122A1 AGAINST *LEISHMANIA MAJOR* IN CUTANEOUS LEISHMANIASIS

*Archana Reddy**
Amity Institute of Pharmacy, Amity University Mumbai, Maharashtra, India
***Email Id**: reddyarchana7505@gmail.com*

Abstract:

Cutaneous leishmaniasis (CL), caused by *Leishmania* spp., is a neglected tropical disease for which currently available treatments are associated with toxicity, prolonged administration, limited accessibility, and variable therapeutic efficacy. Drug repurposing offers a promising strategy for identifying alternative antileishmanial agents by exploiting the established pharmacological profiles of existing drugs. The present study aims to investigate the potential repurposing of four clinically used antifungal azoles, namely clotrimazole, ketoconazole, itraconazole, and fluconazole, against *Leishmania major*, a causative species of CL.

CYP5122A1, a sterol C4-methyl oxidase involved in parasite sterol biosynthesis and reported to be essential for *L. major* survival, was selected as the molecular target. Three-dimensional structural modelling and molecular docking will be employed to evaluate the binding potential of the selected antifungal agents toward CYP5122A1. The docked complexes will be assessed based on binding affinity, hydrogen-bond interactions, hydrophobic

ISSN: 2584-2781

interactions, and interactions with key active-site residues. Comparative analysis of the four compounds will be performed to identify the ligand exhibiting the most favourable predicted interaction with CYP5122A1. The study is expected to provide a computational basis for prioritising existing antifungal agents as potential candidates for repurposing against *L. major* and to support further experimental investigation of CYP5122A1 as a promising therapeutic target for CL.

Keywords: *Cutaneous leishmaniasis, Leishmania major, drug repurposing, antifungal azoles, CYP5122A1, molecular docking.*

INADDP/M-14

NANOPARTICLES FOR CANCER DRUG DELIVERY: IMPROVING THERAPEUTIC EFFICACY

Vandana Pal
[1]S.N. College of Pharmacy Babupur, Lakhauwa, Jaunpur, U.P. 222132, India
Email Id: *vipulp19956@gmail.com*

Abstract:

While conventional chemotherapy is frequently linked to poor drug specificity, systemic toxicity, limited bioavailability, and negative effects on healthy tissues, cancer continues to be one of the leading causes of morbidity and mortality globally. Drug delivery using nanoparticles has shown promise in enhancing the safety and therapeutic efficacy of anticancer drugs. Therapeutic molecules can be conjugated or encapsulated by nanoparticles, which offer site-specific, controlled, and prolonged drug release. Improved drug solubility, stability, circulation time, and accumulation at tumor sites are made possible by their small size and adjustable surface characteristics. Polymeric nanoparticles, lipid nanoparticles, solid lipid nanoparticles, liposomes, dendrimers, and inorganic nanoparticles are among the nanocarriers that have been studied for cancer treatment. Both active targeting with particular ligands and passive targeting with the increased permeability and retention effect may increase drug accumulation in tumor tissues and decrease exposure to healthy cells. Systems based on nanoparticles may also facilitate the delivery of novel treatments like nucleic acids and combination therapy. Toxicity, stability, manufacturing, tumor heterogeneity, scale-up, and regulatory approval are still issues, though. Nanomedicine research may contribute to the development of more individualized, safe, and efficient cancer treatment plans.

Keywords: *Targeted drug delivery; Anticancer therapy; Controlled release; Nanoparticles; Cancer drug delivery; Nanomedicine; Therapeutic efficacy.*

INADDP/M-15

ISSN: 2584-2781

INNOVATING THERAPEUTICS THROUGH NATURAL PRODUCTS, COMPUTATIONAL CHEMISTRY AND PRECISION DRUG DESIGN

*Sahil Saini**, Ramanpreet walia
**Student, Master of Pharmacy, Pharmaceutical Chemistry, Amity University, Noida, -201313*
1Professor & Central Head, Amity University, Noida, -201313
***Email Id**: sahiil.saini5005@gmail.com*

Abstract:

The growing complexity of diseases and the limitations of conventional therapies have created a need for innovative approaches to drug discovery and therapeutic development. Natural products continue to serve as an important source of structurally diverse and biologically active molecules, providing valuable scaffolds for the development of new therapeutic agents. Advances in computational chemistry have further strengthened this process by enabling the systematic investigation of ligand–target interactions, binding modes and molecular properties before experimental validation. Techniques such as molecular docking, virtual screening, molecular dynamics simulations, quantitative structure–activity relationship analysis and in-silico ADME prediction can help identify promising candidates and optimize their pharmacological profiles. Integration of these approaches with precision drug design allows the structural features of natural compounds to be explored and modified according to specific molecular targets and disease pathways. Such an integrated strategy can support the rational design of novel derivatives with improved potency, selectivity, pharmacokinetic properties and therapeutic potential. Furthermore, combining computational predictions with phytochemical profiling and experimental studies can reduce the time, cost and uncertainty associated with early-stage drug development. This multidisciplinary approach highlights the potential of natural product-inspired molecules and computational tools in advancing targeted and personalized therapeutic strategies. Overall, the convergence of phytochemistry, computational chemistry and precision drug design offers a promising framework for discovering safer, more effective and next-generation therapeutics.

INADDP/M-16

"LEARNING ANALYTICS TO PREDICT LEARNER PERFORMANCE IN EARLY CHILDHOOD EDUCATION"

Janhvi Pandey1, Kapil Kumar Gupta2
1,2 Amity University Uttar Pradesh, Lucknow Campus, INDIA
Email Id: *pandeyjanhvi621@gmail.com*.

Abstract:

The project "Learning Analytics to Predict Learner Performance in Early Childhood

ISSN: 2584-2781

Education" is about using data to understand how well younger kids are performing well in school. The main goal of the Learning Analytics to Predict Learner Performance in Early Childhood Education project is to find out which students need help early on so teachers can step in and help to make a difference. If we can predict how well a kid will do, we can make sure they get the help they need to succeed. This helps create a learning environment that is designed to each child needs. In the Learning Analytics to Predict Learner Performance in Early Childhood Education project we collect information about things like how kids come to school their test scores, how much they participate in class and how they behave when they learn. We take this data and clean it up then use different machine learning programs to look for patterns that show how well kids will do. Using charts and graphs to show what we find out so teachers can easily understand the results and make good decisions.

Building the Learning Analytics to Predict Learner Performance in Early Childhood Education project using Python in Google Colab and Jupyter Notebook. Used libraries like Pandas to handle the data NumPy to do math, Matplotlib to make the data look nice and Scikit-learn to build and test our machine learning models. NotebookLm for research assistance. These tools help us look at the data quickly and make predictions that actually mean something. Over all the Learning Analytics to Predict Learner Performance in Early Childhood Education project shows how looking at data can help teachers make choices tailor learning, to each kid and make early childhood education better. The Learning Analytics to Predict Learner Performance in Early Childhood Education project is really important because it helps kids get the education they deserve. As today's world is advancing in every aspect, early childhood education system must advance as well.

Keywords: *Learning Analytics, Early Childhood Education, Learner Performance Prediction, Machine Learning, Student Performance, Predictive Analytics, Student Behavior, Academic Performance, Data Preprocessing, Data Analysis, Personalized Learning, Early Intervention, Student Assessment, Python, Google Colab, Jupyter Notebook, Pandas, NumPy, Matplotlib, Scikit-learn, Data Visualization,*

INADDP/M-17

NANOMEDICINE IN DIABETIC NEPHROPATHY: FROM DRUG DELIVERY TO KIDNEY PROTECTION

*Rishabh Singh, Pallavi Tiwari**
Department of pharmacology, Department of pharmacology
United institute of pharmacy, Naini, Prayagraj 211010 India
Email Id: *singhrishabh09876@gmail.com.*

ISSN: 2584-2781

Abstract:

Diabetic nephropathy is one of the major complications of diabetes and is a leading cause of chronic kidney disease. High blood glucose levels for a long period can damage the small blood vessels and tissues of the kidneys, gradually reducing their ability to filter blood properly. Although available medicines can help control blood glucose and slow kidney damage, their effectiveness may be limited by poor drug delivery, side effects, and difficulty in reaching the affected kidney tissues. Nanomedicine is an emerging approach that may overcome some of these limitations. Nanoparticles can be used as drug carriers to improve drug solubility, stability, and controlled release. They can also help deliver therapeutic agents more effectively to kidney tissues, potentially reducing unwanted effects on other organs. Different nanocarriers, including lipid nanoparticles, polymeric nanoparticles, nanoemulsions, and other nanostructures, are being investigated for diabetic nephropathy. These systems may also provide kidney-protective effects by reducing oxidative stress, inflammation, and cellular damage associated with diabetes.

Overall, nanomedicine offers a promising strategy for improving the management of diabetic nephropathy through targeted and controlled drug delivery. However, further research is needed to establish the safety, long-term effectiveness, and clinical applicability of these nanotechnology-based treatments. Future developments in nanomedicine may contribute to better kidney protection and improved quality of life for patients with diabetes.

Keywords: *Nanomedicine, Diabetic Nephropathy, Nanoparticles, Drug Delivery, Targeted Therapy, Kidney Protection, Oxidative Stress, Inflammation, Diabetes Mellitus, Nanocarriers.*

INADDP/M-18

CART CELL THERAPY - A REVOLUTIONARY APPROACH FOR jiMALIGNANCY

Vipin Tiwari[1], Md Kaish [1], Divyash Singh[1]
1. Himalayan Institute of Pharmacy and Research, BKT , Lucknow
Email Id: *mdkaish123786@gmail.com.*

Abstract:

Chimeric antigen receptor CAR-T cell therapy is also known as adaptive cell therapy cell therapy involves the reprogramming and redirecting of patient's T cells utilizing and enhancing the normal capacity of the patients immune system. In this process T cells are genetically engineered to introduce the CARs on the surface turning them into more efficient cancer fighting machines. These receptors are composed of an internal T cell receptor TCR signaling region coupled with external single chain variable fragment (scFv) linked

ISSN: 2584-2781

antibodies. This advancement allows T cells to engage tumor cells independently of human leukocyte antigen (HLA) expressions. CAR-T cell therapy has soon remarkable success in treating lymphocyte lymphoid malignancies like leukaemia and lymphoma. CAR - T cell therapy has emerged as an innovative approach to cancer treatment leveraging in the immune systems capabilities to identify and eradicate management cells.Clinically trials have demonstrated CAR-T cells can induced prolonged remissions in patient with B cells malignancies often with minimal long term toxicity and probably correct curative for a subset of patient. India's first CAR T -cell therapy, known as NexCAR19, is a ground breaking development for treating leukaemia patients . This therapy was developed by immunoACT ,a startup incubated at the Indian Institute of technology Bombay (IITB) ,and it has received approval from the CENTRAL DRUG STANDARDS CONTROL ORGANISATION (CDSCO) the impressive efficacy, CAR-T cell therapy is not devoid of limitations, with side effects such as cytokine release syndrome (CRS) and neurological problem. To confront these challenges ,continuous research is dedicated to improving treatment methods, and exploring new designs for CAR, and understanding resistance mechanisms.

Keywords: *Chimeric antigen receptor, Human leucocyte antigen, Cytokine release syndrome, T cell receptor.*

INADDP/M-19

ISOLATION AND COMPREHENSIVE CHARACTERISATION OF ΦECODURGA, A NOVEL LYTIC COLIPHAGE TARGETING ANTIMICROBIAL-RESISTANT UROPATHOGENIC *ESCHERICHIA COLI*

Ayushi Agrawal[1], Abhishek Nandy[1], Nidhi Rai[1,2], Manodeep Sen[2] Aditi Singh[1*]

[1]Amity Institute .of Biotechnology, Amity University Lucknow, Uttar Pradesh, India

[2] Department of Microbiology, Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh, India

****Email Id:*** *asingh3@lko.amity.edu.*

Abstract:

The global emergence of multidrug-resistant (MDR) uropathogenic *Escherichia coli* (UPEC) is increasingly compromising conventional antimicrobial therapy and underscores the need for alternative antibacterial strategies. In this study, clinical *E. coli* isolates were characterised, and a novel lytic bacteriophage was isolated and evaluated for its biological and physicochemical properties. Ten *E. coli* isolates were recovered from urine and catheter-associated clinical samples collected at the Department of Microbiology, Dr. Ram Manohar Lohia Institute of Medical Sciences (RMLIMS), Lucknow. Isolates

ISSN: 2584-2781

were initially identified using HiChrome UTI agar and confirmed by matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry (MALDI-TOF MS). Antimicrobial susceptibility testing following CLSI M100 guidelines revealed considerable resistance, particularly to norfloxacin (8/10), ampicillin-sulbactam (6/10), ciprofloxacin (5/10), and levofloxacin (5/10), highlighting the clinical relevance of the isolates.

A novel lytic coliphage, designated **φEcoDurga,** was isolated from sewage water collected from the RMLIMS sewage treatment plant using the double-layer agar assay, with clinical isolate AA029 serving as the propagation host. The phage titre increased from 5.40×10^6 to 6.78×10^9 PFU/mL following amplification and PEG-NaCl precipitation. φEcoDurga produced small, clear plaques (~0.8 mm) and exhibited lytic activity against a broad panel of clinical and reference *E. coli* strains, although no detectable activity was observed against DH5α and K145. Transmission electron microscopy revealed an icosahedral head and an elongated tail of approximately 163 nm, consistent with a Siphoviridae-like morphology. Importantly, φEcoDurga retained infectivity across a broad range of environmental conditions, demonstrating detectable activity from 4–55°C and pH 4–10, with maximal activity at 25–37°C and pH 6–7. One-step growth analysis at an MOI of 0.1 demonstrated a 0–15 min latency period, followed by a pronounced rise phase between 20–50 min and a stable plateau from 50–90 min, reaching 9.64 $\log_{10}$ PFU/mL. Collectively, the broad host lytic spectrum, high propagation efficiency, rapid replication kinetics, and physicochemical stability of φEcoDurga identify it as a promising candidate for further development against drug-resistant UPEC and warrant subsequent genomic safety assessment and in-vitro and in-vivo therapeutic evaluation

***Keywords**: Antimicrobial resistance; bacteriophage therapy; coliphage; phage isolation; host range; lytic activity; phage stability.*

INADDP/M-20

NEXT-GENERATION ANTI-ULCER THRAPEUTICS: A CRITICAL REVIEW OF SULPHONAMIDE DERIVATIVES

Altaf Husen, Nishi Gupta
Department of pharmaceutical chemistry, United Institute of Pharmacy, Naini, Prayagraj
***Email Id**: sakaldiha332108@gmail.com.*

Abstract:

Peptic ulcer disease remains a major gastrointestinal disorder characterised by disruption of the gastric or duodenal mucosal barrier, inflammation, oxidative stress, and an imbalance between aggressive and protective factors.

ISSN: 2584-2781

Although conventional antiulcer drugs provide effective symptomatic relief, limitations such as recurrence, adverse effects, drug interactions, and emerging therapeutic challenges have stimulated interest in the development of safer and more multifunctional agents. These problems have created a need for more advanced treatment options that are more effective and work through a wider range of mechanisms. Recent advances in the design of substituted and hybrid sulphonamide derivatives have provided opportunities to modulate multiple pathological pathways associated with ulcer development, including gastric acid secretion, oxidative stress, inflammation, and impairment of mucosal defense. This review summarizes recent developments in sulphonamide-based antiulcer scaffolds, with emphasis on their structural features, pharmacological rationale, structure–activity relationships, and proposed mechanisms of gastroprotective action. The influence of different substituents and pharmacophoric modifications on biological activity and drug-like properties is also discussed. The integration of sulphonamide chemistry with contemporary medicinal chemistry and drug-discovery approaches offers a promising pathway toward safer, more effective, and potentially multifunctional therapeutics for peptic ulcer disease.

Key words: *peptic ulcer, sulphonamide, antiulcer agents, anti-oxidant, anti-Helicobacter pylori.*

INADDP/M-21

NEXT-GENERATION FERULIC ACID DERIVATIVES FOR DIABETIC WOUND HEALING: FROM MOLECULAR DESIGN TO PROPOSED NANOTECHNOLOGY-BASED DELIVERY

*Ritwika Jaiswal, Amit Kumar Mishra**
Department of Pharmaceutical Chemistry, United Institute of Pharmacy, Naini, Prayagraj
Email Id: *jaistwinkle806@gmail.com*

Abstract:

Diabetic wound healing remains a major therapeutic challenge due to persistent inflammation, oxidative stress, impaired angiogenesis, and dysregulated extracellular matrix remodeling. Ferulic acid (FA), a naturally occurring phenolic compound, possesses promising antioxidant, anti-inflammatory, and wound-healing properties. However, its therapeutic translation is constrained by physicochemical and biopharmaceutical limitations, including limited aqueous solubility and challenges associated with bioavailability. These limitations highlight the need for innovative drug-discovery and delivery strategies. The present study focuses on the rational design and synthesis of novel FA derivatives as potential therapeutic candidates for diabetic wound healing. Structural modification of the FA scaffold was undertaken to generate a library of 25

ISSN: 2584-2781

novel derivatives with the aim of optimizing their physicochemical and drug-like properties. The synthesized derivatives are being characterized and evaluated for their potential biological activities relevant to diabetic wound repair. Particular emphasis is placed on the potential modulation of the HYAL1/MMP-9 axis, which plays an important role in extracellular matrix degradation, angiogenesis, and tissue remodeling during wound healing. Furthermore, a nanotechnology-based delivery strategy is proposed as a future approach for optimized FA derivatives to overcome delivery-related limitations. Nano-enabled delivery may improve aqueous dispersibility, stability, localised drug delivery, cellular uptake, and therapeutic exposure. Thus, the integrated approach of molecular modification, biological evaluation, and proposed nanotechnology-based delivery may provide a promising pathway toward next-generation ferulic acid- derived therapeutics for improved diabetic wound healing.

Keywords: *Ferulic acid, Novel derivatives, Diabetic wound healing, HYAL1/MMP9, Molecular drug design, Nanotechnology-based drug delivery.*

INADDP/M-22

ANTIMICROBIAL EFFICACY OF METAL NANOPARTICLES VERSUS CONVENTIONAL ANTIBIOTICS AGAINST *ESCHERICHIA COLI*

Anurag Singh, Diya Nigam, Prachi Srivastava and Shilpi Srivastava*
Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow-226028, India
Email ID: *ssrivastava1@lko.amity.edu*

Abstract:

Antimicrobial resistance (AMR) highlights the urgent need for alternative strategies to manage bacterial infections, positioning metal nanoparticles as promising candidates due to their unique antibacterial mechanisms. This study evaluated the comparative antimicrobial activity of zinc, titanium, magnesium, and copper nanoparticle formulations against *Escherichia coli* using three standard assays: agar well diffusion, Kirby-Bauer disk diffusion, and minimum inhibitory concentration (MIC) determined via optical density at 600 nm. Disk diffusion assays revealed that the nanoparticle samples produced distinct, clear zones of inhibition, with zinc and titanium nanoparticles exhibiting smaller but measurable zones. In agar well diffusion, zinc and titanium nanoparticles exhibited clear growth inhibition against E. coli, whereas magnesium and copper nanoparticles showed limited activity under the conditions tested. Formulation and concentration significantly influenced these inhibitory outcomes. Specifically, freshly prepared nanoparticle suspensions in phosphate-buffered saline (PBS) supplemented with sodium dodecyl sulfate exhibited superior dispersion and

ISSN: 2584-2781

colloidal stability, yielding more consistent antimicrobial observations. Standard antibiotics served as positive controls, with ampicillin as the primary reference across assays, and tetracycline was included in the disk diffusion assay. Although the evaluated metal nanoparticles demonstrated clear antibacterial effects against *E. coli*, Ampicillin consistently outperformed all nanoparticle formulations under the experimental conditions. While metal nanoparticles offer a promising basis for novel antibacterial therapies, their current efficacy remains lower than that of traditional antibiotics. Translating these materials into clinical settings will require further optimization of nanoparticle formulations, rigorous cytotoxicity profiling, and in vivo evaluations to confirm safety and therapeutic potential.

Keywords: Nanoparticles, antimicrobial activity, *E. coli*, cytotoxicity.

INADDP/M-23

LALLEMANTIA ROYLEANA: A NATURAL PLATFORM FOR NEXT-GENERATION THERAPEUTICS

Aransha Maurya[1,2], Suyashi Mishra[1], Uma Shankar[1], Akshita Chakravarty[1], Shivani Sahu[1], Vaishali Sahu[1], Sudeep Tandon[1,2], Ram Swaroop Verma[1,2,*]

[1]*Phytochemistry Division, CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP), PO CIMAP, Lucknow 226015, India*

[2]*Academy of Scientific and Innovative Research (AcSIR), Ghaziabad 201002, Uttar Pradesh, India*

Email Id: *rsverma.cimap@csir.res.in*

Abstract:

Lallemantia royleana (Benth.) Benth, commonly known as Balangu, a medicinal and aromatic plant in the family Lamiaceae, has attracted interest due to its diverse phytochemical constituents and multifunctional seed mucilage. To determine a future research roadmap, this study examined the phytochemical profile, biological activities, physicochemical properties, and emerging nanotechnology-based applications of *L. royleana*, with a focus on its potential as a natural platform for advanced bioactive delivery. In traditional medicine, it is used to treat gastrointestinal, respiratory, urinary, renal, hepatic, and nervous disorders. The seeds contain carbohydrates, proteins, fibre and oil, whereas the seed mucilage is predominantly composed of high-molecular-weight polysaccharides with notable water-binding, thickening and rheological properties. Phenolic and flavonoid compounds and volatile constituents of the essential oil contribute to reported antioxidant, antibacterial, antifungal, antiviral, analgesic and hepatoprotective activities. More importantly, the mucilage has demonstrated potential as a functional carrier in nano-enabled systems. *L. royleana* seed gum/polyvinyl alcohol

ISSN: 2584-2781

nanofibers have been investigated for encapsulating and delivering bioactive plant extracts. Green-synthesised silver nanoparticles using leaf extract showed enhanced antioxidant and antimicrobial activity compared with the extract alone. These findings position *L. royleana* at the interface of natural-product chemistry and nanotechnology, facilitating the development of sustainable, multifunctional and nano-enabled delivery systems with potential therapeutic applications. The study revealed substantial research gaps in secondary metabolite profiling and in the scientific validation of specific traditional uses of *L. royleana*, despite advances in comprehensive pharmacological screening and seed mucilage analysis.

Keywords: *Lallemantia royleana, Therapeutic uses, Primary metabolites, Secondary metabolites, Research gaps*.

INADDP/M-24

SCREENING OF POTENTIAL METAL NANOPARTICLES AS ANTIMICROBIALS AGAINST *S. AUREUS*

Diya Nigam, Anurag Singh, Prachi Srivastava and Shilpi Srivastava*
Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus, Lucknow-226028, India
Email ID: *ssrivastava1@lko.amity.edu*

Abstract:

Staphylococcus aureus is one of the most dangerous bacteria people deal with, since many strains do not respond to antibiotics. To find a better alternative, metal nanoparticles are selected for their ability to interact differently with drugs. The inhibitory effects of four nanoparticles, viz. zinc oxide, titanium oxide, magnesium oxide, and copper oxide, were tested against *S. aureus*, using ampicillin as the primary antibiotic reference. The disk diffusion test was used to determine whether the nanoparticles could inhibit bacterial growth. Ampicillin produced the largest zone of inhibition, while zinc oxide NPs produced a smaller yet noticeable zone, and titanium showed the smallest zone. The well diffusion test was also used for magnesium oxide and copper oxide NPs. Copper oxide NPs were more effective than magnesium oxide NPs at inhibiting bacterial growth. The MIC test was performed on all four nanoparticles to assess the effects of different concentrations on bacterial growth after 24 hours, with optical density (OD) measured at 600 nm. Since a lower OD indicates less bacterial growth and better inhibition, the nanoparticles were initially mixed with normal water, but the results were inconsistent because the particles aggregated and settled to the bottom. However, it was much easier to keep the nanoparticles well mixed for reliable observation when PBS and SDS were used. Ampicillin was the most effective, but zinc oxide and copper oxide NPs also showed good antibacterial activity. The nanoparticles may be useful in the future,

ISSN: 2584-2781

but more tests are needed to assess safety and confirm protocols. The study also showed that proper mixing gives more reliable results.

Key words: *Nanoparticles, Antimicrobial resistance, S. aureus, Antibacterial activity, cytotoxicity.*

INADDP/M-25

NANO-ENABLED GENE EDITING PLATFORMS: CRISPR DELIVERY FOR NEXT-GENERATION THERAPEUTICS

Shefali Madaan Kathuria[*1], Shivang Shukla[1]

[1]*University Institute of Pharma Sciences, Chandigarh University, Gharuan, Mohali, Punjab 140413 India*

Abstract:

The CRISPR-Cas gene-editing system has emerged as a revolutionary technology for the treatment of genetic and acquired diseases by enabling precise modification of target DNA sequences. However, the successful clinical translation of CRISPR-based therapeutics is limited by challenges such as poor stability, inefficient cellular uptake, off-target effects, and the lack of safe and targeted delivery systems. Nanotechnology offers a promising solution to these limitations by providing versatile nanocarriers capable of protecting gene-editing components and facilitating their efficient delivery to specific tissues and cells. Recent advances in nanomedicine have led to the development of lipid nanoparticles, polymeric nanoparticles, lipid–polymer hybrid nanoparticles, inorganic nanocarriers, and exosome-based systems for the delivery of CRISPR plasmids, messenger RNA (mRNA), and ribonucleoprotein (RNP) complexes. These nano-enabled platforms enhance gene-editing efficiency, improve biodistribution, reduce immunogenicity, and minimize unintended genetic modifications. Furthermore, the integration of stimuli-responsive and biomimetic nanocarriers has enabled controlled and site-specific release of CRISPR cargo, thereby improving therapeutic outcomes. Nano-enabled CRISPR delivery systems are being actively explored for the treatment of inherited genetic disorders, cancer, neurodegenerative diseases, cardiovascular diseases, and infectious conditions. Emerging genome-engineering technologies, including base editing and prime editing, when combined with advanced nanocarriers, offer unprecedented opportunities for precise and personalized medicine. Despite challenges related to scalability, long-term safety, and regulatory approval, nano-enabled CRISPR platforms represent a transformative approach in modern therapeutics. Their continued development is expected to accelerate the realization of safe, effective, and next-

ISSN: 2584-2781

generation gene therapies for diverse human diseases.

Keywords: *CRISPR-Cas9, Gene Editing, Lipid Nanoparticles, Nanomedicine, Gene Therapy, Precision Medicine.*

INADDP/M-26

PRIVILEGED HETEROCYCLIC SCAFFOLDS IN NEXT-GENERATION ANTICANCER DRUG DISCOVERY: FROM RATIONAL DESIGN TO PRECISION THERAPEUTICS

Dr Neelima Shrivastava[1]
[1]*Department of Pharmaceutical Chemistry, College of Pharmacy, JSS University, Noida, Uttar Pradesh-201301, India.*
Email Id*: neelimashrivastava14@gmail.com*

Abstract:

Cancer remains a major health challenge, and the development of effective and selective anticancer drugs is an important goal of medicinal chemistry. Heterocyclic scaffolds are widely used in drug discovery because of their structural diversity, favourable binding properties, and ability to interact with different biological targets. This review highlights the importance of privileged heterocyclic scaffolds in the development of next-generation anticancer agents, with emphasis on quinoline, quinazoline, indole, benzimidazole, pyrazole, thiazole, and oxadiazole derivatives. Recent strategies such as molecular hybridization, scaffold modification, and structure–activity relationship studies are discussed for improving potency and selectivity. The role of computer-aided drug-design approaches, including molecular docking, virtual screening, ADMET prediction, and molecular dynamics simulation, in the identification and optimization of promising heterocyclic leads is also highlighted. In addition, the integration of heterocyclic drug design with precision medicine and nanotechnology-based targeted delivery may provide new opportunities to improve therapeutic efficacy and reduce unwanted effects. Overall, privileged heterocyclic scaffolds provide a versatile platform for designing innovative anticancer agents and, when combined with advanced drug-discovery technologies, may contribute to the development of more selective and effective cancer therapies.

Keywords: *Heterocyclic scaffolds, Anticancer agents, Medicinal chemistry, Molecular hybridization, Computer-aided drug design, Precision medicine.*

INADDP/M-27

DEVELOPMENT AND EVALUATION OF ALMOND OIL-LOADED NANOLIPOSOMES FOR INTRANASAL DELIVERY IN ALZHEIMER'S DISEASE

ISSN: 2584-2781

Surbhi S. Chavhan
School of Pharmacy, Parul University, India
***Email Id**: surbhichavhan@gmail.com.*

Alzheimer's disease is a brain disorder that leads to memory loss and thinking difficulties. The present medicines do not work enough and can cause harmful side effects, which has made scientists look for natural healing substances and new ways to send drugs straight to the brain. Almond oil, which is taken from *Prunus dulcis* contains unsaturated fatty acids, vitamin E, phytosterols and polyphenolic compounds that may help protect brain cells and reduce oxidative damage. This study aimed to create and evaluate Almond Oil-Loaded Nanoliposomes for use hoping that they could deliver almond oil more effectively to the brain. Almond oil was obtained by pressing and then incorporated into tiny bubble-like vesicles using the thin-film hydration technique with soy lecithin and cholesterol. Several formulations were prepared by changing the cholesterol-to-lecithin ratio. Were examined for yield, almond oil loading, loading efficiency, physical properties, shape and laboratory release. The optimized formulation showed a loading efficiency of 73.3 %. Produced vesicles smaller than 100 nanometers with a fairly uniform size distribution and a negative surface charge. Laboratory release tests demonstrated a release pattern, with 74.58 % cumulative release after 24 hours following Higuchi kinetics. The optimized formulation was further examined in a scopolamine-induced memory impairment model using tests, biochemical measurements, antioxidant assessments and histopathology. Overall the findings suggest that Almond Oil-Loaded Nanoliposomes may offer an intranasal nanocarrier approach, supporting brain protection and enhancing the therapeutic potential of almond oil, for Alzheimer's disease.

***Keywords:** Almond oil; Nanoliposomes; Intranasal drug delivery; Alzheimer's disease; Neuroprotection; Scopolamine; Antioxidant activity.*

INADDP/M-28

PROBIOTIC-FERMENTED PLANT BIO-ACTIVES AND THEIR NANO-FORMULATION: A NOVEL APPROACH FOR DIABETES MANAGEMENT

Neelam Maurya, Dr. Shanti Bhushan Mishra*
Department of pharmacology, Department of pharmacognosy
United Institute of pharmacy, Naini, Prayagraj 211010 India
Email ID: neelammaurya1209@gmail.com

Abstract:

Diabetes mellitus is a major metabolic disorder that is increasing worldwide and is associated with high blood glucose levels, oxidative stress, and several long-

ISSN: 2584-2781

term complications. Plant bioactive compounds such as phenolics, flavonoids, and other antioxidants have shown promising antidiabetic properties. However, their effectiveness can be limited by poor stability, solubility, and bioavailability. Probiotic fermentation is an emerging approach that may improve the availability and biological activity of plant bioactive compounds through microbial transformation. Furthermore, nanotechnology can be used to formulate these bio-actives into nanosized delivery systems, potentially improving their stability, absorption, and therapeutic performance. The combination of probiotic fermentation with nanotechnology may provide a novel strategy for enhancing the therapeutic potential of natural bio-actives in diabetes management. Fermented bio-actives loaded into nanoparticles could potentially improve glucose regulation, reduce oxidative stress, and support better metabolic health. This approach represents an emerging link between *probiotics, natural-product chemistry, and nanomedicine*. Further in-vitro, animal, and clinical studies are needed to establish their safety, effectiveness, and practical application in diabetes management.

Keywords: *Diabetes mellitus, probiotic fermentation, Nanotechnology, bioactive, oxidative stress, Bioavailability.*

INADDP/M-29

ADVANCEMENT IN DRUG DELIVERY TO THE BRAIN FOR NEUROPROTECTIVE MANAGEMENT

*Harsh Kumar**, Dr. Sunil Kumar Singh*
United Institute of Pharmacy, UCER A-31/1, UPSIDC Industrial Area, Naini, Prayagraj 211010
Email Id: *Harshdharmveer8@gmail.com.*

Abstract:

One of the biggest challenges in the treatment and neuroprotective management of neurological and neurodegenerative disorders is the delivery of therapeutic substances to the brain. Although crucial for maintaining brain homeostasis, the blood–brain barrier (BBB) substantially limits the entry of many medications into the central nervous system, thereby lowering therapeutic efficacy and reducing brain bioavailability. To achieve effective medication concentrations at the target site, traditional drug-delivery methods are frequently insufficient. Promising solutions to these constraints have been made possible by recent developments in pharmaceutical nanotechnology and targeted drug delivery techniques. For effective brain delivery, several types of advanced technologies have been studied, including liposomes, solid lipid nanoparticles (SLNs), nanostructured lipid carriers (NLCs), polymeric nanoparticles, nanoemulsions, micelles,

ISSN: 2584-2781

dendrimers, and exosome-based carriers. Drug solubility, stability, bioavailability, controlled release, and retention in brain tissues can all be enhanced by these methods. In addition, intranasal drug delivery has become an effective nose-to-brain technique that can reduce the problems of systemic administration and the blood-brain barrier by promoting the direct transfer of therapeutic substances through the olfactory and trigeminal pathways. The selective localization of medications in the brain may be further improved by targeted delivery techniques such as receptor-mediated, ligand-based, and biomimetic methods. Oxidative stress, neuroinflammation, mitochondrial dysfunction, apoptosis, and neuronal degeneration may all be reduced with improved neuroprotective drug delivery. Therefore, there is an extensive amount of promise for enhancing therapeutic results while reducing systemic side effects through the development of brain-targeted drug delivery methods. To maximize targeting effectiveness, formulation stability, safety, and clinical translation of these innovative delivery systems for effective neuroprotective treatment, more research is needed.

Key Words: *Brain-targeted drug delivery; Blood–brain barrier; Nanocarriers; Neuroprotective therapy; Neurodegenerative disorders*

INADDP/M-30

BEYOND CONVENTIONAL ELECTROSPINNING: ADVANCED NANOFIBER ARCHITECTURES FOR CONTROLLED AND PROGRAMMABLE DRUG DELIVERY

*Diptee Gupta**, Shashank Soni
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow-226028, INDIA
Email Id: *km.gupta12@s.amity.edu*.

Abstract:

Over the past few decades, electrospinning has advanced rapidly as a simple and adaptable method for creating fibers with diameters ranging from micrometers to tens of nanometers that have complex and distinctive morphologies. This has led to new technologies and approaches that utilize electrohydrodynamic phenomena in electrospinning, resulting in unique apparatuses that have changed the discipline. Because of their high surface area, interconnected porosity, customizable shape, and capacity to integrate various therapeutic drugs, electrospun nanofibers have emerged as flexible drug delivery platforms. However, there may be drawbacks to conventional monolithic nanofibers, including uncontrolled initial drug release, restricted control over spatial drug dispersion, and challenges in creating sequential or combination drug administration. Recent developments in

ISSN: 2584-2781

electrospinning technology have therefore redirected attention from traditional nanofibers to architecturally designed nanofibrous structures. With a focus on core-shell, multilayer, multi-compartment, Janus, and side-by-side nanofibers, this presentation discusses new nanofiber architectures intended to accomplish regulated and programmable drug delivery. The impact of spatial drug localization, polymer choice, fiber design, and manufacturing approach on drug encapsulation, safeguarding of medicinal compounds, and release kinetics is examined. Recent developments in these architectures show how constraints of traditional electrospun systems can be overcome by using nanoscale structural organization. Future advancements in electrospun nanofiber technology will need to incorporate precise architectural control, logical polymer selection, and predictable drug-release behavior. In summary, architecturally designed nanofibers signify a promising approach for advanced, regulated, and controlled drug delivery techniques.

Keywords: *Nanofiber, Electrospinning, Core shell, Controlled drug delivery.*

INADDP/M-31

METABOLITE PROFILING AND THERAPEUTIC EVALUATION OF RUDRAKSHA (ELAEOCARPUS GANITRUS) AGAINST HYPERTENSION AND DEMENTIA: AN LC-HRMS APPROACH

Komal Dixit [2], Satyam Sharma[1,2]

[1] Department of Pharmacology & Toxicology, National Institute of Pharmaceutical Education and Research, Hajipur, Bihar, India

[2] Department of Pharmacology, School of Pharmacy, Faculty of Pharmacy, Parul University, Waghodia Vadodara, 391760, Gujarat, India.

Email:

satyam.sharma42834@paruluniversity.ac.in

Abstract:

Hypertension is a leading risk factor for vascular dementia and cognitive decline. *Elaeocarpus ganitrus* Roxb. (Rudraksha), a traditional Ayurvedic plant, is rich in flavonoids and phenolics but its role in hypertension-associated cognitive impairment is unexplored. This study aimed to profile the methanolic seed extract of *E. ganitrus* (EGR) using LC-HRMS and evaluate its therapeutic efficacy against DOCA-salt induced hypertension and dementia. Phytochemical profiling was performed by HPLC-DAD and LC-HRMS, revealing a complex mixture enriched with flavonoids, phenolic acids, and ellagic acid derivatives with RSD <2%. Hypertension was induced in Wistar rats by subcutaneous deoxycorticosterone acetate (DOCA, 20 mg/kg) with 1% NaCl for 12 weeks, followed by 4 weeks oral treatment with EGR (100 and 200 mg/kg) or Telmisartan. EGR produced a dose-

ISSN: 2584-2781

dependent reduction in systolic blood pressure ($p<0.05$), attenuated renal hypertrophy (KW/BW, KV/BW), and significantly reduced circulating angiotensin-II and cardiac ACE1/ACE2 expression. It restored nitric oxide, decreased MDA, and enhanced SOD and CAT activities. EGR also reduced aortic IL-6 and brain AChE activity ($p<0.05$). In Morris water maze, EGR improved spatial learning and memory, evidenced by reduced escape latency and increased target quadrant time and platform crossings ($p<0.05$), with preservation of cortical and hippocampal architecture.Overall, EGR demonstrates antihypertensive, antioxidant, anti-inflammatory, and cholinergic-modulatory activities, improving cognitive performance, possibly via RAAS modulation.

Keywords: *Elaeocarpus ganitrus; Rudraksha; Hypertension; Vascular dementia; RAAS; LC-HRMS.*

INADDP/M-32

ENHANCING THERAPEUTIC POTENTIAL OF PHYTOCHEMICALS THROUGH NANOSTRUCTURE LIPID CARRIER-BASED DELIVERY

*Dhvani Rafaliya**[1], Aditya Singh [2]
*[1]Department of Pharmaceutical Technology, Parul Institute of Pharmacy and Research, Faculty of Pharmacy, Parul Univerisity, Limda, Waghodia, Vadodara,391760, Gujarat, India
Email:
dhvanirafaliya1330@gmail.com.

Abstract:

The therapeutic potential for phytochemicals is enormous, because of their anti-inflammatory, antioxidant, antimicrobial and anticancer activities, but this is difficult because of their low aqueous solubility, low bioavailability, degradation and lack of targeting in tissues. To overcome these limitations, a new class of nanocarriers was developed, the nanostructure lipid carriers (NLCs), which are lipid-based and are able to render phytochemicals more effective medicinal agents. This review discusses the possibilities of NLC based delivery systems to enhance bioavailability, stability, solubility, controlled release and targeted release of bioactive phytochemicals. The drug loading capability and protection of phytochemicals against chemical and enzymatic degradation are achieved with NLCs, which are made up of a mixture of solid and liquid lipids and are stabilized with appropriate surfactants. The tunability of the cell-specific targeting of nanoscale size and their surface properties could enable better cellular penetration and targeting. In recent years, new NLC formulations with phytochemicals such as curcumin, quercetin, resveratrol and berberine show better pharmacological

ISSN: 2584-2781

activity than conventional formulations. In addition, optimizing the lipid composition, particle size, surface properties and release of the particles could enhance therapeutic outcome. While NLC-based delivery is a very promising method to see the translation of phytochemical-therapeutics to effective and clinically relevant uses, there remain several challenges to be overcome such as scale-up, long-term stability, toxicity and regulatory standardization.

Keywords: *Phytochemicals; Nanostructure Lipid Carriers; Nanotechnology; Bioavailability; Targeted Delivery; Controlled Release.*

INADDP/M-33

FROM PHYTOCHEMICAL DISCOVERY TO NANO-THERAPEUTICS: EXPLORING *MICHELIA CHAMPACA LINN.* FOR NEXT-GENERATION BURN WOUND HEALING

Muskan Kushwaha
Krishna Institute of Pharmacy and Sciences, Tatiyaganj, Kanpur
Email*:*
muskankushwaha183@gmail.com

Abstract:

Burn injuries are associated with oxidative stress, persistent inflammation, microbial invasion, impaired re-epithelialization and delayed tissue regeneration, creating a need for multifunctional and localized therapeutic strategies. *Michelia champaca* Linn. (Magnoliaceae) is a medicinal plant containing diverse bioactive phytoconstituents with reported antioxidant, anti-inflammatory and antimicrobial properties. Although burn-wound healing activity has been reported for *M. champaca* flowers, the therapeutic potential of its leaves remains comparatively underexplored, providing a rationale for their systematic investigation. The present study explores *M. champaca* leaves as a potential phytotherapeutic lead for burn wound management and proposes a translational pathway from phytochemical discovery to nano-enabled therapy. Hydroalcoholic leaf extract is subjected to physicochemical and preliminary phytochemical evaluation, followed by assessment of relevant biological activities and in-vivo burn-wound healing parameters. Promising phytochemical fractions/constituents may subsequently be prioritized as therapeutic leads using chromatographic profiling and activity-guided evaluation. To address limitations of conventional topical herbal delivery, including instability, poor aqueous solubility and limited retention at the wound site, integration with nanotechnology-based delivery platforms is proposed. Polymeric nanoparticles, lipid-based nanocarriers or nanohydrogels could facilitate localized, sustained and controlled delivery while potentially improving phytochemical stability and bioavailability. The proposed

ISSN: 2584-2781

phytochemical-to-nanotherapeutic strategy integrates natural-product drug discovery with advanced drug-delivery technology and may provide a rational platform for multifunctional burn therapy targeting oxidative stress, inflammation, microbial burden and tissue regeneration. This approach could contribute to the development of standardized, scalable and next-generation plant-derived therapeutics for burn wound management.

Keywords: *Michelia champaca; burn wound; phytochemical discovery; nanotechnology; nano-therapeutics; drug delivery; wound regeneration.*

INADDP/M-34

NEXT-GEN CANCER THERAPY: THE CONVERGENCE OF ARTIFICIAL INTELLIGENCE, NANOTECHNOLOGY, AND DIGITAL TWIN.

Sushil Prajapati
Faculity of Pharmacy Integral University Lucknow , India.
Email: *psushilprajapati9918@gmail.com*

Abstract:

The combination of artificial intelligence [AI] and nanotechnology is revolutionizing cancer therapy by using precision medicine, enhancing early diagnosis, and optimizing drug delivery with a target. AI-driven nanocarriers are a next-generation platform for real-time biomarker identification, controlled drug release, and tailored treatment regimens that significantly augment the therapeutic effect and minimize systemic toxicity. Machine learning models aid rational nanomaterial design, predicting drug interactions, and formulating optimization for better bioavailability and tumor targeting. Quantum processing and AI-driven modeling are accelerating drug discovery, enhancing diagnostic accuracy, and automating clinical decisions. In addition, Digital Twin [DT] technology is turning out to be an oncology game-changer with virtual patient simulates that integrate genomic, clinical, and imaging data in order to forecast disease progression and tailor treatment. By bridging the gap between computer simulations and real-world clinical utilization, DTs allow for more effective treatment planning, dispense with trial-and-error approaches, and improve patient outcomes. However, major obstacles such as data harmonization, explainability of algorithms, regulation, and ethics remain challenges to large-scale uptake. Overcoming these constraints by interdisciplinary collaboration between researchers, clinicians, and regulatory bodies will be key to achieving the maximum potential of AI-based nanomedicine. This review explores the revolutionary impact of AI-driven nanocarriers and digital twin technology in cancer treatment, observing how they can transform cancer therapy through

ISSN: 2584-2781

predictive analytics, intelligent drug delivery, and second-generation personalized therapy methods.

INADDP/M-35

INSIGHT OF TOPICAL LIPOSOMAL DRUG DELIVERY SYSTEM FOR THE MANAGEMENT OF SURFACE BACTERIAL INFECTIONS.

Afroj Alam and Dr. Snigdha Bhardwaj*
K.I.E.T. SCHOOL OF PHARMACY, Delhi-NCR, Ghaziabad-Meerut Road, Ghaziabad-201206, Uttar Pradesh, India, 8092903687.
Email Id: *afrojalam07786@gmail.com.*

Abstract:

The skin is exposed to different environmental and internal factors that may trigger reactive oxygen species (ROS) production and cause oxidative stress. Excessive ROS can lead to a variety of skin problems, including inflammation, premature aging, sunburn, slow wound healing, hyperpigmentation, and other skin damage. While antioxidants can help to protect skin against oxidative damage, topical application of antioxidants is often challenging as many antioxidants are unstable, hydrophobic and unable to penetrate skin effectively. Liposomal gels are a good way to get around these problems. Liposomes are tiny lipid-based vesicles that are able to deliver hydrophilic and hydrophobic antioxidants. They can protect antioxidants from breaking down and improve how they are delivered to the skin and retained there. Liposomes may also be incorporated into gel formulations, where they may remain on the skin for a longer period and allow for a controlled release of the active compounds. The present review deals with the preparation and evaluation of liposomal gels loaded with antioxidants. Important factors such as lipid composition, cholesterol content, drug-to-lipid ratio, particle size, surface charge, polymer concentration and gel viscosity are discussed. Its potential use in dermatology and cosmetology is also discussed as well as its challenges and future prospects.

Keywords: *Liposomal gel, Antioxidants, Oxidative stress, Reactive oxygen species (ROS), Topical drug delivery, Skin retention.*

INADDP/M-36

DIGITAL-TWIN–GUIDED ORGAN-ON-A-CHIP PLATFORMS FOR PERSONALIZED NANOTHERAPEUTIC DISCOVERY: BRIDGING THE SILICON–CARBON DIVIDE

*Aarzu Tripathi**, Rudra Pratap Singh
Kashi Institute of Pharmacy, Mirzamurad Varanasi
Email Id: *aarzutripathi60@gmail.com*

Abstract:

ISSN: 2584-2781

The development of next-generation therapeutics requires drug discovery platforms that can predict human responses more accurately than conventional cell cultures and animal models. This review explores the emerging integration of nanotechnology with organ-on-a-chip (Organ-on-chip) systems, artificial intelligence (AI), and digital twins for personalized drug discovery. Nanocarriers can improve the delivery, targeting, and controlled release of therapeutic agents, but their clinical translation is often limited by the inability of traditional preclinical models to predict individual biological responses. Human-derived Organ-on-chip platforms provide a dynamic and physiologically relevant environment to study the absorption, distribution, toxicity, and therapeutic performance of nanomedicines. When real-time data from these platforms are integrated with AI-based digital twins, it becomes possible to create patient-specific computational models that continuously simulate and predict therapeutic outcomes. This "silicon–carbon" integration may enable virtual optimization of nanotherapeutic formulations before clinical testing, thereby reducing experimental burden, development cost, and late-stage failure. Although challenges related to data integration, model validation, standardization, regulatory acceptance, and scalability remain, the convergence of these advanced platforms represents a promising direction for precision medicine. Digital-twin–guided Organ-on-chip technology could therefore transform nanotherapeutic discovery from a population-based trial-and-error process into a more predictive, adaptive, and personalized approach.

Keywords: *Digital twins; Organ-on-a-chip; Nanotherapeutics; Artificial intelligence; Precision medicine; Drug discovery; Personalized therapy*

INADDP/M-37

HERBAL IMMUNOMODULATORS: FORMULATION, CHARACTERIZATION AND THERAPEUTIC POTENTIAL

*Dr. Prashant Kumar Desai**
Lachoo Memorial College of Science and Technology (Autonomous) Pharmacy Department, Jodhpur, Rajasthan, India

Abstract:

Herbal immunomodulators are gaining increasing attention as potential therapeutic agents because medicinal plants contain diverse bioactive phytoconstituents, including flavonoids, alkaloids, terpenoids, polyphenols, and glycosides, that may regulate immune responses. However, poor aqueous solubility, low bioavailability, variable absorption, degradation, and batch-to-batch variation can limit their pharmaceutical application. This review explores the potential of integrating herbal immunomodulators with nanotechnology

ISSN: 2584-2781

to improve formulation performance and therapeutic delivery. Different nanocarrier approaches, including polymeric, lipid-based, inorganic, and natural nanocarriers, are considered for encapsulating or delivering selected herbal bioactives such as curcumin, quercetin, resveratrol, berberine, and withaferin A. The formulation strategy involves selection and authentication of the herbal source, extraction or isolation of bioactive compounds, phytochemical characterization, nanocarrier selection, nanoparticle preparation, optimization, and physicochemical characterization. Important evaluation parameters include particle size, polydispersity index, zeta potential, entrapment efficiency, morphology, Fourier-transform infrared spectroscopy, differential scanning calorimetry, and stability studies. Immunomodulatory potential may be assessed through in-vitro parameters such as cell viability, macrophage activation, cytokine analysis, nitric oxide production, oxidative-stress markers, and inflammatory mediators, followed by appropriate in-vivo evaluation. Nanotechnology may enhance solubility, stability, controlled release, cellular uptake, and bioavailability of herbal bioactives. Nevertheless, nanoparticle toxicity, reproducibility, scale-up, regulatory challenges, and limited clinical evidence remain important barriers. Integrating traditional herbal knowledge with modern nanomedicine therefore represents a promising research direction for developing better-delivered and more reproducible herbal immunomodulatory formulations.

Keywords
Nanotechnology, Nanoparticles, Phytoconstituents, Drug delivery, Nanocarriers

INADDP/M-38

TRACING THE DEVELOPMENT OF GLAUCOMA RESEARCH: A SCIENTOMETRIC STUDY

Abishek Tripathi[1], Neeraj Jain*[1]
*[1] *Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow-226028, India*

Abstract:

Glaucoma is a progressive optic neuropathy and a leading cause of irreversible blindness worldwide, making sustained research essential for improving prevention, diagnosis, and treatment. This scientometric study traces the development of glaucoma research by examining publication growth, influential contributors, collaborative networks, major journals, and evolving thematic priorities. Relevant records can be retrieved from established bibliographic databases using terms such as “glaucoma,” “intraocular pressure,” “optic nerve,” and related diagnostic and therapeutic keywords. Bibliometric indicators, including annual publication output,

ISSN: 2584-2781

citation counts, h-index, productive countries, institutions, authors, journals, co-authorship patterns, and keyword co-occurrence, enable evaluation of the field's intellectual and social structure. Previous global analyses show sustained, near-exponential growth in glaucoma literature, with a major expansion during recent decades; one study of 1900–2019 reported 33,631 original articles and an annual growth rate of 5.1% over the preceding 30 years. The United States has remained a leading contributor, while research output and international collaboration have increased substantially across Asia, particularly China and India. The thematic evolution of the field indicates an early emphasis on epidemiology, intraocular pressure control, and conventional surgery, followed by increasing attention to optic nerve imaging, optical coherence tomography, retinal ganglion-cell biology, genetics, trabecular meshwork dysfunction, minimally invasive glaucoma surgery, drug delivery, artificial intelligence, and gene-based therapies. Mapping these patterns identifies influential knowledge clusters and emerging research frontiers, while also revealing geographical and institutional inequalities in scientific participation.

Keywords: *Citation, Collaboration, Glaucoma, Scientometric analysis, Mapping of data.*

INADDP/M-39

NANO-ENABLED THERAPEUTICS: EMERGING PLATFORMS FOR EFFECTIVE AND TARGETED DRUG DELIVERY

Dr. Renu Solanki
Lachoo Memorial College of Science and Technology (Autonomous) Pharmacy Department, Jodhpur, Rajasthan, India.
Email Id: renusolanki5382@gmail.com

Abstract:

Nanotechnology has emerged as a transformative approach in pharmaceutical sciences, offering innovative platforms to overcome limitations associated with conventional drug delivery systems. Nano-enabled therapeutics utilize engineered nanoscale carriers, including liposomes, polymeric nanoparticles, lipid nanoparticles, nanoemulsions, dendrimers, and inorganic nanocarriers, to improve drug solubility, stability, bioavailability, controlled release, and site-specific delivery. These systems can enhance therapeutic efficacy by facilitating drug transport across biological barriers and enabling targeted accumulation at diseased tissues through passive and active targeting strategies. Recent advances in surface functionalization, ligand-mediated targeting, stimuli-responsive delivery, and personalized nanomedicine have further expanded their potential in the management of cancer, infectious

ISSN: 2584-2781

diseases, neurological disorders, and chronic conditions. This review highlights emerging nano-enabled platforms and discusses their design principles, mechanisms of drug loading and release, targeting approaches, therapeutic applications, and translational potential. Particular emphasis is placed on how nanocarriers can reduce systemic exposure and improve the pharmacokinetic and pharmacodynamic profiles of therapeutic agents. Despite significant progress, challenges related to toxicity, biocompatibility, manufacturing scalability, stability, regulatory requirements, and long-term safety remain important considerations for clinical translation. Overall, nano-enabled therapeutics represent a promising strategy for developing effective, precise, and patient-oriented drug delivery systems, with continued interdisciplinary research expected to facilitate their safe and successful integration into modern healthcare.

Keywords: *Nanotechnology, Nano-enabled therapeutics, Targeted drug delivery, Nanocarriers, Controlled release, Nanomedicine.*

NADDP/M-40

COMPUTATIONAL AND EXPERIMENTAL CHARACTERIZATION OF FATTY ACID METHYL ESTERS IN THERMALLY PROCESSED INDIAN RAPESEED OIL

Ravi Pratap[1,2], Ramesh Chandra Dubey[3], Rahul Kumar Maurya*[1]

[1]*Amity Institute of Pharmacy, Amity University Uttar Pradesh Lucknow Campus, Lucknow. 226028, India.*

[2]*Department of Pharmaceutical Sciences, Gurukul Kangri (Deemed to be University), Haridwar, Uttrakhand, 249404, India.*

[3]*Department of Botany and Microbiology, Gurukul Kangri (Deemed to be University), Haridwar, Uttrakhand, 249404, India.*

***Email id**: rkmaurya@lko.amity.edu; rahulkumarmaurya@gmail.com*

Abstract:

This goal of the study was to find out how thermal oxidation affected Indian rapeseed oil's physicochemical characteristics and possible safety profile. The study's specific objectives were to assess changes in oil quality and specific biochemical parameters after thermal treatment, as well as to characterize the physicochemical and assay-interference properties of 14 fatty acid methyl esters (FAMEs) found by GC–FID in thermo-oxidized rapeseed oil. 14 FAMEs with short-, medium-, and long-chain saturated and unsaturated molecules were assessed using a structure-oriented in silico method. 123 predicted descriptors or endpoints that matched the ADMETlab 3.0 output framework were included in the analysis. Correlations between molecular weight, lipophilicity, solubility, hERG

ISSN: 2584-2781

toxicity, and BBB-related factors were investigated, also physicochemical characteristics and ADMET-related data were examined. Physicochemical parameters, such as acid value, peroxide value, refractive index, p-anisidine value, iodine value, saponification value, specific gravity, and smoke point, were measured when Indian rapeseed oil was thermally treated at 180°C for 4 and 8 hours. The results show that the expected ADMET properties of FAMEs, specifically their lipophilicity and aqueous solubility, are influenced by carbon-chain length and degree of unsaturation. Additionally, thermal oxidation modifies the physicochemical characteristics of Indian rapeseed oil and is linked to modifications. In general, the computational predictions need more experimental validation and should be seen as supporting evidence. This study may contribute to improved understanding of the safety implications associated with prolonged thermal exposure of edible oils and provide a basis for identifying potentially hazardous lipid-derived compounds.

Keywords: *Indian rapeseed oil; fatty acid methyl esters; thermal processing; ADMET; assay interference; computational toxicology.*

INADDP/M-41

NANOTECHNOLOGY-BASED DRUG DELIVERY SYSTEMS: ADVANCES, THERAPEUTIC APPLICATIONS AND SAFETY CONSIDERATIONS

Kirti
Sam Higginbottom University of Agriculture, Technology & Sciences, Naini, Prayagraj
Email Id: *kirtik0606@gmail.com*

Abstract:

Nanotechnology-based drug delivery systems have emerged as promising approaches for improving the therapeutic performance of conventional and advanced medicines. These systems employ nanoscale carriers such as liposomes, polymeric nanoparticles, solid lipid nanoparticles, nanoemulsions, dendrimers and metallic nanoparticles to modify drug solubility, stability, bioavailability, distribution and release. Nanocarriers can facilitate targeted and controlled delivery, potentially improving drug accumulation at desired sites while reducing unwanted exposure to healthy tissues. Recent developments have expanded their applications in cancer therapy, infectious diseases, neurological disorders, cardiovascular conditions, dermatology and gene delivery. Stimuli-responsive systems, combination drug delivery, nucleic-acid delivery and theranostic platforms represent important advances in the field. Despite these opportunities, challenges remain in large-scale manufacturing, physicochemical characterization, stability, reproducibility, cost, regulatory requirements and long-

ISSN: 2584-2781

term safety assessment. Overall, nanotechnology-based drug delivery offers considerable potential for next-generation therapeutics by enabling more precise, controlled and effective delivery of therapeutic agents. Continued interdisciplinary research, standardized characterization and well-designed clinical studies are essential for translating promising nanomedicine platforms from laboratory research into safe and clinically meaningful applications.

Keywords: *Nanotechnology; Drug Delivery; Nanocarriers; Targeted Theapy; Controlled Release; Nanomedicine*

INADDP/M-42

ORGANOID-ON-A-CHIP AND NANOTECHNOLOGY: AN EMERGING PLATFORM FOR NEXT-GENERATION DRUG DISCOVERY

Nidhi Yadav[1], Md Kaish[1*] Divyash Singh[1]
1.Himalayan Institute of Pharmacy & Research, BKT, Lucknow.
Email Id: *mdkaish123786@gmail.com.*

Abstract:

The conventional drug discovery and development process is associated with high attrition rates, substantial costs, and limited translation of preclinical findings to human clinical outcomes. Conventional two-dimensional cell cultures and animal models often fail to adequately reproduce the complex architecture, cellular interactions, physiological microenvironment, and disease characteristics of human tissues. Organoid-on-a-chip (OoC) technology, integrated with nanotechnology, has emerged as a promising next-generation platform for improving the predictability and efficiency of drug discovery. Organoids are three-dimensional, multicellular tissue models capable of recapitulating several structural and functional characteristics of human organs, while microfluidic organ-on-a-chip systems provide controlled physiological conditions such as fluid flow, mechanical forces, nutrient gradients, and cell–cell interactions. The incorporation of nanotechnology further enhances these platforms through engineered nanoparticles, nanosensors, nanocarriers, and nano-enabled imaging systems for precise drug delivery, real-time monitoring, and therapeutic evaluation. Nanoformulations can be screened using organoid-based models to investigate drug penetration, cellular uptake, toxicity, pharmacokinetics, and therapeutic responses in a more physiologically relevant environment. Furthermore, integration with artificial intelligence, high-throughput screening, multi-omics, and advanced imaging can facilitate rapid analysis of complex biological data and enable prediction of drug efficacy and toxicity. Such integrated platforms have potential applications in

ISSN: 2584-2781

cancer therapeutics, neurological disorders, cardiovascular diseases, infectious diseases, and personalized medicine. Despite their potential, challenges including standardization, reproducibility, vascularization, scalability, regulatory acceptance, and integration of complex biological systems remain. Overall, the convergence of organoid technology, microfluidics, and nanotechnology represents a transformative approach toward more predictive, personalized, and ethically sustainable drug discovery, potentially accelerating the development of safer and more effective next-generation therapeutics.

Keywords: *Organoid-on-a-chip; Nanotechnology; Drug discovery; Microfluidics; Nanomedicine; Precision medicine.*

INADDP/M-43

AI-DRIVEN NANOTECHNOLOGY FOR PERSONALIZED CANCER THERAPY: FROM NANOCARRIER DESIGN TO PRECISION TREATMENT

Piyush Gupta[1], Md Kaish[1*] Divyash Singh[1]
1.Himalayan Institute of Pharmacy & Research, BKT, Lucknow
Corresponding author: mdkaish123786@gmail.com.

Abstract:

Cancer therapy is increasingly shifting from conventional, non-specific treatment strategies toward precision approaches that consider the molecular and genetic characteristics of individual patients. The integration of artificial intelligence (AI) with nanotechnology represents a promising strategy for developing personalized cancer therapeutics with improved efficacy and reduced systemic toxicity. AI-driven platforms can analyze complex genomic, transcriptomic, proteomic, imaging, and clinical datasets to identify patient-specific therapeutic targets and predict treatment responses. Concurrently, advanced nanocarriers such as liposomes, polymeric nanoparticles, dendrimers, nanogels, and lipid nanoparticles can be rationally engineered for selective drug delivery to tumor tissues.

Machine learning and deep learning algorithms facilitate the prediction and optimization of critical nanocarrier characteristics, including particle size, surface charge, drug-loading capacity, stability, release kinetics, cellular uptake, and tumor-targeting efficiency. AI can further support the selection of suitable therapeutic agents and targeting ligands based on tumor-specific biomarkers. Integration of stimuli-responsive nanocarriers with AI-based predictive models may enable controlled drug release in response to tumor-associated conditions such as pH, enzymes, hypoxia, or redox imbalance. Moreover, AI-assisted analysis of medical imaging and patient-derived molecular profiles can

ISSN: 2584-2781

contribute to treatment stratification and real-time monitoring of therapeutic outcomes.

Despite these advances, challenges including data heterogeneity, model interpretability, nanoparticle toxicity, manufacturing reproducibility, regulatory validation, and clinical translation remain significant. Future development of explainable AI, multimodal datasets, digital twins, and intelligent nanomedicine platforms could further enhance individualized cancer treatment. Thus, the convergence of AI and nanotechnology offers a transformative framework for designing smarter nanotherapeutics and advancing precision oncology from computational prediction to patient-specific treatment.

Keywords: *Artificial Intelligence; Nanotechnology; Personalized Medicine; Cancer Therapy; Nanocarriers.*

INADDP/M-44

EVALUATION OF INDIAN MEDICINAL HERBS AND THEIR COMBINATIONS AGAINST UROPATHOGENIC ESCHERICHIA COLI: AN IN VITRO ANTIMICROBIAL STUDY

*Ayushi Singh**, Abhishek Nandy

Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus, Gomti Nagar Extension, Lucknow (INDIA).

***Email Id**:singhayushii2555@gmail.com*

Abstract:

Urinary tract infections (UTIs) are commonly associated with uropathogenic Escherichia coli (UPEC), while increasing antimicrobial resistance has stimulated interest in plant-derived alternatives. This study will evaluate the antibacterial activity of neem (Azadirachta indica), asparagus (Asparagus racemosus), aloe vera (Aloe barbadensis), and amla (Phyllanthus emblica), individually and in combination, against UPEC. Plant extracts will be prepared and evaluated using agar well diffusion and broth microdilution assays. Antibacterial activity will be assessed by determining zones of inhibition (ZOI), minimum inhibitory concentrations (MICs), and minimum bactericidal concentrations (MBCs). Individual extracts will be compared to identify the most active plant extract, followed by evaluation of selected combinations for enhanced antibacterial activity. Growth-kinetic analysis may further be used to assess the effect of promising treatments on bacterial growth over time. The potential enhanced activity of combinations may be associated with the complementary effects of diverse phytochemicals, including phenolics, flavonoids, tannins, terpenoids, alkaloids, and saponins, which may act through multiple antibacterial mechanisms. The study aims to investigate whether combinations of selected Indian medicinal herbs provide greater inhibitory effects against UPEC than individual extracts. The findings may contribute to the

ISSN: 2584-2781

exploration of plant-derived antimicrobial formulations as potential complementary approaches for addressing uropathogenic bacterial infections and the growing challenge of antimicrobial resistance. Further checkerboard and time-kill analyses could be undertaken to determine the synergistic nature of promising combinations.

Keywords: *Uropathogenic Escherichia coli, medicinal herbs, antimicrobial activity, plant extracts, MIC, combination therapy.*

INADDP/M-45

USE OF HYDROGELS LOADED WITH HYDROGELS FOR DIABETIC WOUND HEALING

*Abhinav Verma**, Shashank Soni
Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow-226028, INDIA.
****Email Id**:* *abhinav.verma9@s.amity.edu*.

Abstract:

Diabetic wounds represent a significant clinical challenge due to prolonged inflammation, oxidative stress, impaired angiogenesis, and delayed tissue regeneration. Bioactive hydrogels have emerged as promising wound dressing systems owing to their high water content, biocompatibility, moisture-retention capacity, and potential for controlled therapeutic delivery. The present research focuses on the development of a bioactive hydrogel for enhanced diabetic wound healing by incorporating suitable biopolymers and therapeutic bioactive agents. The proposed hydrogel system aims to provide a favorable wound microenvironment while addressing oxidative stress, microbial infection, and impaired tissue repair associated with diabetes. Formulation development will involve the selection of compatible polymers, optimization of polymer and bioactive concentrations, and evaluation of physicochemical and functional properties. The developed hydrogel will be characterized for swelling behavior, gel strength, rheological properties, drug content, in vitro release, antioxidant activity, antimicrobial potential, and cytocompatibility. Further biological evaluation may be performed using relevant in vitro wound-healing models and suitable diabetic wound models, following ethical approval. The study is expected to contribute to the development of a multifunctional, biocompatible, and therapeutically effective hydrogel platform for diabetic wound management and advanced topical drug delivery.

Keywords: *Bioactive hydrogel, diabetic wound healing, controlled drug delivery, antioxidant activity, tissue regeneration.*

INADDP/M-46

NANOTECHNOLOGY-ENABLED TOPICAL DELIVERY OF TERBINAFINE FOR THE

ISSN: 2584-2781

MANAGEMENT OF DERMATOPHYTIC INFECTIONS: RECENT ADVANCES AND FUTURE PERSPECTIVES

Yash kesarwani, Amit Kumar Singh*
Department of pharmaceutics, Department of pharmaceutical chemistry
United Institute of Pharmacy Prayagraj 211010 India
Email Id- *yashkesarwani7242@gmail.com*

Abstract:

Dermatophytic infections are common superficial fungal diseases caused by dermatophytes such as Trichophyton, Microsporum, and Epidermophyton, and their management remains challenging because of inadequate drug retention and penetration associated with conventional topical formulations. Terbinafine is a potent allylamine antifungal agent widely used for the treatment of dermatophytosis; however, its poor aqueous solubility and limitations associated with conventional delivery systems have encouraged the development of advanced nanotechnology-based approaches. This review highlights recent advances in nanoparticle-mediated topical delivery of terbinafine, with particular emphasis on solid lipid nanoparticles (SLNs), nanostructured lipid carriers (NLCs), polymeric nanoparticles, and nanolipidgel systems. Published studies indicate that incorporation of terbinafine into nanoscale carriers can improve drug deposition within skin layers, provide controlled or sustained drug release, enhance local antifungal activity, and potentially reduce the frequency of administration. Terbinafine-loaded SLNs and NLCs have demonstrated promising characteristics for topical delivery, while polymeric nanoparticles have also been investigated for efficient intradermal localization. The incorporation of lipid nanoparticles into gel systems further combines nanoscale drug delivery with the convenience of topical application. Recent evidence, including clinical investigation of terbinafine-NLC gel, suggests the potential of nanotechnology to improve topical antifungal therapy. Overall, nanotechnology-based terbinafine delivery represents a promising next-generation strategy for improving treatment outcomes in dermatophytic infections, although further clinical and translational studies are required.

Keywords: *Terbinafine, Nanotechnology, Solid lipid nanoparticles, Nanostructured lipid carriers, Dermatophytosis, Topical drug delivery*

INADDP/M-47

BILARYER AND MULTILAYER TABLET: ADVANCES IN MODIFIED DRUG RELEASE

Khushi Gupta
S.N. College of Pharmacy, Babupur Lakhauwa Jaunpur., U.P. 222125.

ISSN: 2584-2781

Email Id: *khushigp900@gmail.com*

Abstract:

Bilayer and multilayer tablets are advanced oral drug delivery systems designed to improve therapeutic efficacy through controlled and modified drug release. These tablets consist of two or more layers containing different drugs or drug-release patterns, allowing immediate, sustained, delayed, or sequential release. They are particularly useful for combination therapy, reducing dosing frequency and improving patient compliance. Recent advances in formulation technologies, polymers, compression methods, and manufacturing techniques have enhanced their stability, precision, and performance. However, challenges such as layer separation, weight variation, and manufacturing complexity remain. This review highlights the formulation approaches, advantages, challenges, and future prospects of bilayer and multilayer tablets.

Keywords*: Bilayer tablets, multilayer tablets, modified drug release, controlled release, sustained release, drug delivery systems, combination therapy, oral dosage forms.*

INADDP/M-48

Artificial Intelligence-Guided Lipid Nanoparticles: A Next-Generation Platform for Precision Drug Delivery

Rudra Pratap Singh*, Aarzu Tripathi
Kashi Institute of Pharmacy, Mirzamurad Varanasi
Email Id: *thakurrudra7068@gmail.com*

Abstract:

The integration of artificial intelligence (AI) with lipid nanoparticle (LNP) technology represents a promising next-generation approach to precision therapeutics and advanced drug discovery. Conventional nanoparticle development often relies on extensive trial-and-error experimentation to optimize critical parameters such as particle size, lipid composition, drug encapsulation, stability, biodistribution, and controlled release. AI and machine learning. (ML) can accelerate this process by analyzing complex experimental datasets, predicting structure–function relationships, and identifying optimized formulations with improved therapeutic performance. LNPs are versatile nanocarriers capable of delivering small-molecule drugs, proteins, and nucleic acid-based therapeutics, including mRNA and siRNA.
AI-guided platforms may further improve targeted delivery by predicting biological interactions, cellular uptake, pharmacokinetic behaviour, toxicity, and therapeutic outcomes. The integration of high-throughput screening with AI also enables faster exploration of large formulation spaces, reducing the time and resources required for conventional drug development. Recent advances suggest that AI-assisted LNP design could support

ISSN: 2584-2781

personalized medicine by tailoring carrier properties and therapeutic strategies to specific disease characteristics. Despite these advantages, challenges including data quality, model interpretability, large-scale manufacturing, regulatory requirements, and clinical translation remain significant. Overall, the convergence of AI and lipid nanotechnology offers a powerful platform for developing safer, more efficient, and patient-specific therapeutics. Continued interdisciplinary research may establish AI-guided LNPs as an important component of future drug discovery and precision medicine.

Keywords: *Artificial intelligence; Lipid nanoparticles; Nanotechnology; Machine learning; Precision therapeutics; Drug delivery; Advanced drug discovery.*

AMITY INSTITUTE OF PHARMACY, LUCKNOW CAMPUS

Programmes Offered:

- B. Pharm (4 years)
- Pharm. D (6 years)
- M. Pharm in Pharmaceutics (2 years)
- M. Pharm in Pharmacology (2 years)

Key Highlights

- Modern Laboratories with advanced instruments
- Industry exposure through leading hospital & Pharma MOUs
- Experienced faculty with industry & global exposure
- Dedicated faculty mentorship for every student
- Innovation Incubation Centre for entrepreneurship & skills

PREMIUM PLACEMENTS

Abbott | parexel | Zydus Cadila | MACLEODS PHARMACEUTICALS LTD. | SUN PHARMA | cognizant

RECOGNITIONS & ACRREDITATIONS

PHARMACY COUNCIL OF INDIA | QCI QUALITY COUNCIL OF INDIA Creating an Ecosystem for Quality | nirf NATIONAL INSTITUTIONAL RANKING FRAMEWORK

NIRF RANKING 2026 : 21

Amity Institute of Pharmacy,
Academic Block 2, Amity University Uttar Pradesh
Lucknow Campus, Nijampur Malhaur, Chinhut, 226010