2nd PharmaInnovate Summit 2025

November 22 & 23, 2025

"International Conference on

"From Molecule to Medicine: Drug development, Drug Delivery and Lifesaving Therapies

Organized By:

Galgotias College of Pharmacy, Galgotias Educational Institutions 1, Knowledge Park-II, Greater Noida – 201310, India

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About Galgotias College of Pharmacy, Greater Noida, Uttar Pradesh

Galgotias College of Pharmacy, located in the dynamic educational hub of Greater Noida, is a premier institution committed to excellence in pharmaceutical education, research, and innovation. Established with a vision to nurture academic leadership and scientific advancement, the College offers state-of-the-art laboratories, advanced research facilities, and an experienced faculty dedicated to shaping future professionals for the global pharmaceutical industry.

The College's programs are approved by the Pharmacy Council of India (PCI), a statutory body under the Ministry of Health & Family Welfare, Government of India, and affiliated with Dr. A.P.J. Abdul Kalam Technical University (AKTU), Lucknow. As part of the Galgotias group-comprising Galgotias University, Galgotias College of Engineering & Technology, and Galgotias Institute of Management & Technology—the institution benefits from a strong academic ecosystem known for quality education, innovation, and multidisciplinary learning.

About the Conference

The PharmaInnovate Summit 2025, themed "Shaping the Future of Medicine through Innovations in Drug Discovery and Delivery for Better Healthcare," is an international platform bringing together leading academicians, researchers, industry professionals, and regulatory experts. The conference will feature keynote addresses, expert talks, and oral and poster presentations highlighting innovations in artificial intelligence, biotechnology, biopharmaceuticals, pharmacology, toxicology, clinical research, regulatory affairs, pharmacovigilance, drug safety, and novel drug delivery systems.

The event aims to foster scientific dialogue, promote collaboration, and showcase cutting-edge research that addresses unmet medical needs and improves patient outcomes.

Expected Outcomes

The conference seeks to strengthen partnerships among academia, industry, and regulatory bodies, accelerating the translation of scientific discoveries into impactful therapeutic solutions. It aims to facilitate knowledge exchange, identify emerging trends, stimulate innovation, and ultimately contribute to the development of advanced, effective, and patient-centric treatments that enhance global healthcare.

Message from the Desk of

Shri Suneel Galgotia

Chairman, Galgotias College of Pharmacy, India

It is a moment of immense pride and honor to welcome you all to the PharmaInnovate Summit 2025, hosted by Galgotias College of Pharmacy. This International conference unites distinguished academicians, researchers, industry experts, and innovators from across the world to share their insights and discoveries that are shaping the future of pharmaceutical sciences and healthcare.

At Galgotias, we are steadfast in our commitment to academic excellence, innovation, and research that drives meaningful change. The PharmaInnovate Summit 2025 stands as a reflection of our dedication to nurturing intellectual curiosity, promoting collaboration, and encouraging scientific exploration at a global level.

It is indeed heartening to witness the participation of eminent speakers and delegates representing diverse regions and disciplines. Their contributions and perspectives will undoubtedly enrich the discussions and inspire transformative ideas for the betterment of healthcare worldwide.

I take this opportunity to extend my heartfelt appreciation to all the speakers, presenters, and participants for their valuable contributions, and to the organizing committee for their tireless efforts in making this event a grand success. I am confident that this summit will pave the way for new collaborations and innovations that will have a lasting impact on the pharmaceutical field.

With warm regards,
Suneel Galgotia
Chancellor, Galgotias University

Message from the Desk of

Dr. Dhruv Galgotia
CEO, Galgotias College of Pharmacy, India

It gives me immense pleasure to extend a warm welcome to all the distinguished delegates, speakers, and participants of the PharmaInnovate Summit 2025, an International Conference on "From Molecule to Medicine: Drug development, Drug Delivery and Lifesaving Therapies", being held on 22nd-23rd November 2025 at Galgotias College of Pharmacy.

This conference is a proud milestone that reflects our enduring commitment to fostering innovation, advancing scientific research, and promoting excellence in pharmaceutical education. At Galgotias, we believe that collaboration among academia, industry, and research organizations is vital to addressing the complex healthcare challenges of our time.

It is truly inspiring to see experts and scholars from various parts of the world come together on this platform to exchange ideas, share experiences, and explore new horizons in the field of pharmacy. The deliberations and outcomes of this summit will undoubtedly open pathways for meaningful collaborations and impactful discoveries.

I sincerely appreciate the dedicated efforts of the organizing committee, faculty, and partners whose hard work has made this event possible. I am confident that the PharmaInnovate Summit 2025 will serve as a beacon of inspiration, fostering innovation and excellence that will contribute to a healthier and better tomorrow.

With sincere regards,
Dr. Dhruv Galgotia
CEO, Galgotias College of Pharmacy

Message from the Desk of

Aradhana Galgotia
Director Operations

It gives me great pleasure to extend a warm welcome to all the esteemed delegates, speakers, and participants of the PharmaInnovate Summit 2025, organized by Galgotias College of Pharmacy. This prestigious event provides an exceptional platform for collaboration, innovation, and the exchange of knowledge among leading professionals, researchers, and academicians in the field of pharmaceutical sciences.

We are honored to host distinguished experts and participants from across the globe, each contributing their valuable insights toward advancing drug discovery, development, and delivery for better healthcare outcomes. The exchange of ideas and perspectives during this summit will undoubtedly inspire new directions in research and innovation.

As we delve into discussions on emerging trends and challenges in the pharmaceutical domain, I encourage every participant to engage wholeheartedly, share ideas, and cultivate collaborations that will transcend institutional and geographical boundaries.

May this summit serve as a source of inspiration and a stepping stone toward groundbreaking discoveries that will benefit humanity at large. I extend my best wishes for a successful and enriching conference experience for all.

With warm regards,
Aradhana Galgotia
Director Operations

Message from the Desk of

Dr. Vikram Sharma
Director, Galgotias College of Pharmacy
Organizing Chairman, PharmaInnovate Summit 2025

It gives me immense pleasure to welcome you all to the **PharmaInnovate Summit 2025**, an international platform dedicated to advancing research, innovation, and global collaboration in pharmaceutical sciences. This esteemed conference brings together visionary academicians, renowned researchers, distinguished industry professionals, and young innovators who are collectively driving the future of healthcare.

At Galgotias College of Pharmacy, we believe in fostering an environment where knowledge is explored, ideas are exchanged, and innovation is encouraged. The PharmaInnovate Summit 2025 is a testament to our continuous efforts to promote academic excellence and meaningful research that contributes to societal well-being.

It is truly inspiring to witness such remarkable participation from experts and delegates representing diverse specializations and global regions. Their contributions will undoubtedly stimulate thought-provoking discussions and inspire groundbreaking advancements in drug development and healthcare technologies.

I extend my sincere appreciation to all the invited speakers, presenters, and participants for sharing their expertise and enriching this event with their scholarly contributions. My heartfelt gratitude also goes to the organizing team for their dedication and hard work in bringing this summit to fruition.

I am confident that the deliberations and outcomes of this conference will spark new collaborations, innovative approaches, and valuable insights that will shape the future of pharmaceutical research and patient care.

With best regards,
Dr. Vikram Sharma
Director, Galgotias College of Pharmacy
Organizing Chairman, PharmaInnovate Summit 2025

Guest of Honour

Dr. Hongyun Tai, PhD, MBA
Co-founder and CEO of Branca Bunús Ltd.

Dr. Hongyun Tai is an experienced entrepreneur and academic with over 20 years of expertise in polymer chemistry, gene therapy, and biotechnological innovations. As the CEO of Branca Bunús Ltd. Since 2019, a pioneering biotech company specializing in non-viral gene therapy for rare genetic diseases like Epidermolysis Bullosa (EB) and the development of high-performance gene transfection reagents, Dr. Tai has been at the forefront of advancing novel therapeutic solutions for gene therapy and drug delivery systems.

With a PhD in Polymer Chemistry from the University of Nottingham and an MBA from Bangor University in UK, Dr. Tai held academic positions in UK, where she advanced research on polymeric biomaterials and supervised numerous PhD and MSc students. Dr. Tai's research spans functional polymeric devices for regenerative medicine and drug delivery, focusing on biodegradable polymers, hybrid hydrogels, and gene delivery systems. Her expertise has led to numerous grants, publications, and patent applications in the areas of gene therapy, drug delivery, and biomaterials. In addition to her entrepreneurial and academic contributions, she actively participates in public engagement and has delivered keynote presentations at international conferences on drug delivery and gene therapy.

Company logo and short introduction

Branca Bunús

Branca Bunús Ltd is a pioneering gene therapy start-up and a leading biotechnology company, committed to developing and commercializing polymer-based gene therapies for patients with genetic disorders worldwide. Its mission is to transform innovative scientific discoveries into life-changing clinical treatments and become leaders in non-viral gene therapy solutions for debilitating genetic conditions. Branca Bunús Ltd is also specializing in the development and commercialization of high-efficiency transfection reagents, driven by our proprietary "HPAE" technology for both research and industrial applications. It aims to provide cutting-edge solutions that enhance the production of recombinant proteins and viral vectors, making transfection more accessible, cost-effective, and advantageous over traditional methods like PEI or lipid-based reagents.

Speakers

1. Speaker

Prof. Vladimir Tolmachev

Professor at the Department of Immunology, Genetics and Pathology
Uppsala University, Sweden

Prof. Vladimir Tolmachev is a Professor at the Department of Immunology, Genetics and Pathology, Uppsala University, Sweden, and Head of the Centrum for Oncotheranostics at Tomsk Polytechnic University, Russia. With a Ph.D. in Biomedical Radiation Sciences, he is a global leader in the development and preclinical evaluation of radiolabelled biologically active compounds for imaging and therapy. His pioneering work on engineered scaffold proteins has advanced the field of radionuclide-based diagnostics and therapeutics. He has authored 457 scientific publications, holds an H-index of 71, and has supervised 28 Ph.D. students and 14 postdoctoral researchers. Prof. Tolmachev has received prestigious awards including the EANM Springer Prize and Bill Eckelman Prize, and he serves on the editorial boards of numerous high-impact journals. His work is widely supported by major funding bodies such as the Swedish Cancer Society and the Swedish Research Council.

2. Speaker

Prof. Dr. H.C. Thomas Rades
Department of Pharmacy
Faculty of Health and Medical Sciences
University of Copenhagen

Prof. Dr. Dr. h.c. Thomas Rades is a distinguished expert in pharmaceutical design and drug delivery, currently serving at the University of Copenhagen. He earned his PhD summa cum laude from the Technical University of Braunschweig (1994) and has held professorships in Denmark and New Zealand, along with senior roles in industry and academia. Over a 25+ year career, he has led more than 80 PhD projects, secured major research funding (e.g., LEO Foundation, Novo Nordisk Foundation), and managed collaborations with global pharma companies. His prolific output includes 3 books, 17 book chapters, 551 peer-reviewed articles, 14 patents, and over 800 conference presentations, with a Google Scholar h-index of 96 and 33,716 citations total. His research focuses on amorphous and high-energy solid formulations to improve drug bioavailability and stability.

3. Speaker

Dr. Renata Fonseca Vianna Lopez
Full Professor of Pharmaceutical Technology
University of São Paulo, Brazil

Renata Lopez is a Full Professor at the School of Pharmaceutical Sciences of Ribeirão Preto, University of São Paulo (USP), where she leads the Center for Innovation in Nanostructured Systems and Topical Administration (NanoTop). Her research focuses on nanobiotechnology, drug delivery systems, and non-invasive routes of administration, with special emphasis on combining physical methods, such as iontophoresis, with advanced nanocarriers to enhance drug penetration across biological barriers. She holds a PhD in Pharmaceutical Sciences from USP and completed international research training at the University of Geneva and MIT. Prof. Lopez has over 100 peer-reviewed publications, several patents, and significant experience in coordinating national and international research projects, including collaborations across Europe, Canada, Africa, and South America. She serves as Deputy Editor-in-Chief of the Journal of Drug Delivery Science and Technology and sits on the Editorial Board of the International Journal of Pharmaceutics. She is also an active member of the Controlled Release Society (CRS) and leads initiatives promoting women in science within the CRS community.

4. Speaker

Dr. Olga Borges
University of Coimbra, Portugal

Dr. Olga Borges is an Associate Professor at the Faculty of Pharmacy, University of Coimbra, Portugal, and Principal Investigator of the "Vaccines and Adjuvants" group at the Center for Neuroscience and Cell Biology (CNC-CIBB). With a PhD in Pharmaceutical Technology and over 25 years of academic experience, she is internationally recognized for her work in nanotechnology-based vaccine delivery systems. Her research focuses on mucosal immunization (oral and intranasal) and the development of safe, biopolymer-based nanoparticulate adjuvants for subunit, DNA, and mRNA vaccines targeting diseases like hepatitis B, anthrax, giardia, and COVID-19. Dr. Borges has authored over 80 publications, 61 of which are in high-impact Q1 journals, and holds two patents. She has received the "World's Top 2% Scientist" recognition by Elsevier/Stanford (2022, 2023) and has led or contributed to 19 funded projects. She is a mentor to numerous PhD, MSc, and postdoctoral researchers and serves on editorial boards of major journals, while also engaging in science outreach and education. Her work bridges pharmaceutical sciences, nanomedicine, and translational vaccine research.

5. Speaker

Prof. Wenxin Wang
The Charles Institute of Dermatology,
School of Medicine,
University College Dublin
Ireland

Prof. Wenxin Wang is a distinguished polymer scientist and biomedical engineer, currently serving as Full Professor at the Charles Institute of Dermatology, University College Dublin (UCD). He earned his Ph.D. in Polymer Science and Engineering from Shanghai Jiao Tong University and has held prestigious positions at institutions across Europe. Prof. Wang is a Science Foundation Ireland Principal Investigator and has secured over €15.5 million in research funding. He has published over 260 peer-reviewed articles and holds 36 patents, with groundbreaking contributions in polymerization methods, hydrogel scaffolds, and gene therapies for rare skin diseases. His innovations have led to the foundation of three biotech companies in Ireland, including Vornia Ltd (acquired by Ashland Inc.), Blafar Ltd., and Branca Bunús Ltd. Several of his technologies have achieved FDA and EMA Orphan Drug status. Prof. Wang has mentored over 70 researchers and is actively involved in public engagement, academic leadership, and commercialization. His work bridges cutting-edge science and real-world applications, impacting healthcare, industry, and policy worldwide.

6. Speaker

Dr. Harendra Parekh
Director of Research
University of Queensland (UQ), Australia

Dr. Harendra S. Parekh is a renowned pharmaceutical scientist, educator, and entrepreneur currently serving as Director of Research at the School of Pharmacy & Pharmaceutical Sciences, University of Queensland (UQ), Australia. He holds a PhD in Medicinal Pharmaceutical Chemistry from the University of Nottingham, UK, and is a registered pharmacist in both Australia and the UK. With over two decades of teaching and research experience, Dr. Parekh has led innovations in drug and peptide delivery systems, particularly via intranasal and mucosal platforms. He has secured over A$10 million in research funding, developed multiple patented technologies including cannabinoid formulations and disulfide-containing compounds and authored impactful around 130 publications on nanomedicine, sol-gels, and targeted therapies. He also holds leadership roles at BioGene Therapeutics and PreveCeutical Medical Inc., and has contributed as a scientific founder at InnarisBio. Recognized with prestigious awards for research translation and education at UQ, he continues to mentor students globally, including at Manipal University, India. His work bridges academia and industry, aiming at transformative healthcare solutions through advanced pharmaceutical technologies.

7. Speaker

Dr. Aliasgar Shahiwala
Professor in the Department of Pharmaceutical Sciences
College of Pharmacy,
Dubai Medical University

With more than 20 years of teaching and research experience, Prof. Shahiwala is currently a Professor in the Department of Pharmaceutical Sciences, College of Pharmacy, Dubai Medical University. Prof. Shahiwala received his master's and a doctorate in pharmaceutics and pharmaceutical technology from The Maharaja Sayajirao University of Baroda, INDIA, and pursued his Postdoctoral Research at Northeastern University, USA. Dr. Shahiwala edited eight books and authored several book chapters and 83 peer-reviewed articles. He is a Highly Cited Researcher and is listed among the top 2% of scientists in Pharmacology and Toxicology. Dr. Shahiwala is an academic editor for PLOS One, editor-in-chief of the Madridge Journal of Analytical Sciences and Instrumentation, Madridge Journal of Pharmaceutical Research editor, and Guest Associate Editor for Biomedical Nanotechnology, Frontiers in Nanotechnology. In addition to his academic experience, Prof. Shahiwala also received more than three years of experience in the Formulation and Development division of large-scale manufacturers of pharmaceuticals and provided industrial consultancies."

8. Speaker

Anna Orlova, Professor

Faculty of Medicine, Uppsala University, Sweden

Dr Anna Orlova is a **Professor of Medicinal Chemistry** at Uppsala University, heading the Theranostics group in the Department of Medicinal Chemistry. With dual doctoral degrees; a Ph.D. in Medical Sciences from Uppsala University and a Ph.D. in Chemistry from the Russian Academy of Sciences-she also holds a civil engineering degree in Chemical Technology. Dr Orlova has authored over 250 peer-reviewed articles, holds a patent, and has an **h-index of 52**. Her research, strongly supported by competitive grants from the Swedish Cancer Society and the Swedish Research Council, centers on the development of peptide-based radiopharmaceuticals targeting prostate cancer (e.g., PSMA, GRPR) and other malignancies. She supervises multiple PhD students, postdoctoral researchers, and master's students, and actively contributes as a reviewer and editorial board member in leading journals.

Program Schedule

Day I (22nd Nov 2025)	
Timing	**Sessions**
9:00 AM- 10:00 AM	Spot registration for the conference
10:00 AM-10:15AM	**Inaugural Session** Lighting of the Lamp with Sarwasti Vandna Felicitation of Speakers and Guest
10:15 AM-10:25 AM	Welcome Address & Seminar Overview Dr. Vikram Sharma, Director, GCOP
10:25 AM-10:40 AM	Inaugural Speech by Chief Guest
10:40 AM-10:45 AM	Souvenir Release
10:45 AM-11:45 AM	**Session-I (Dr. Vladimir Tolmachev Uppsala University, Sweden)**
Topic	Targeting of malignant tumours using engineered scaffold proteins
Tea Break: 11:45 AM-12:00 PM	
12:00 PM- 1:00 PM	**Session-II (Prof. Wenxin Wang, University College Dublin, Ireland)**
Topic	Towards next generation of high-performance Non-viral Gene Delivery Vectors for Safe Gene Medicines and Potent Gene Transfection Reagents
1:00 PM-2:00 PM	**Session- III (Dr. Renata Fonseca Vianna Lopez, University of São Paulo, Brazil)**
Topic	Breaking Barriers: Electric Current and Nanotechnology for Precision Drug Delivery
Lunch: 2:00 PM-3:00 PM	
3:00 PM-4:00 PM	**Session-IV (Dr. Vivek Gupta, St. John's University, New York)**
Topic	Organ-Specific Pharmacokinetics and Pharmacodynamic Assessment via Alternate Routes of Administration & Nanotechnology
4:00 PM -5.00 PM	**Session-V (Dr. Harendra Parekh, University of Queensland (UQ), Australia)**
Topic	Industry-academia alliances – navigating the crossroads of innovative platform delivery science to meet emerging pharma industry demands
High Tea: 4:30 PM-4:45 PM	
Day II (23rd Nov 2025)	
9:15 AM -10:15 AM	**Session-VI (Dr. Thomas Rades, Faculty of Health and Medical Sciences, University of Copenhagen, Denmark)**
Topic	Solid form diversity in pharmaceuticals-a specific look at amorphous compounds
10:15 AM -11:15 AM	**Session-VII (Dr. Anna Orlova, Uppsala University, Sweden)**
Topic	Development of theranostics targeting of prostate cancer.
Tea Break: 11.15 AM-11:30 PM	

11:30 PM -12:30 PM	**Session-VIII (Dr. Olga Borges, University of Coimbra, Portugal)**
Topic	From Nose to Immunity: The Future of Intranasal COVID-19 Vaccines
12:30 PM -1:30 PM	**Session-IX (Dr. Aliasgar Shahiwala, Dubai Medical University)**
	Nanosponges for Drug delivery applications
1:30 PM -3:00 PM	Oral session/Poster Session by the Scholars
Lunch: 2:00 PM-3:30 PM	
3:00 PM-4:30 PM	Valedictory function and prize distribution with vote of Thanks
High Tea: 4:30 PM-5:00 PM	

All timings are as per Indian standard time (IST)

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PCEU/PP/30	Monika1, Riddhi Mahlotra1*, Atul Yadav1, Parashvanu1	An Overview : Nanoparticle- based imaging for cancer diagnosis	Kalka Institute For Research & advanced studies, NH-58 Partapur Bypass, Meerut	18
PCEU/PP/31	Ishu tonger*	From Digital Blueprints to Personal Pills: Al and 3D Printing Revolutionize Drug Delivery Systems	GNIT college of pharmacy	18
PCEU/PP/32	Amit Vikram	Drug Delivery Through the Blood-Brain Barrier and Strategies to Enhance its Passage	Accurate College of Pharmacy Greater Noida	19
PCEU/PP/33	Mohd Shoab Ali*, Prashant kesharwani	Combinatorial Drug Delivery Via Targeting Cubosomal Gel Against Non-Melanoma	Department of Pharmaceutics, School of Pharmaceutical Education and Research, Jamia Hamdard, New Delhi, 110062, India	19
PCEU/PP/34	Ayush Rawat1, Medhavi Gupta2, Dr. Reetika Rawat*	Formulation of Clarithromycin-Loaded Nanoparticles for the Treatment of Biofilm Infections	Shri Ram Murti Smarak College of Eng. & Tech. (Pharmacy), Bareilly, U.P., India- 243202	20
PCEU/PP/35	Arvind Kumar1, Parul Gupta2, Dr. Nita Yadav*, Dr. Ritesh Kumar Tiwari*	Nano-Carriers Driven siRNA Delivery in Triple-Negative Breast Cancer: Advances, Challenges, and Future Prospects	Shri Ram Murti Smarak College of Eng. & Tech. (Pharmacy), Bareilly, U.P., India- 243203	20
PCEU/PP/36	SHASHWAT PIPRAIYA	LIPOSOMES: An Innovative Approach to Sustained and Improve the Ocular Drug Delivery	Smt. Vidyawati College of Pharmacy, Jhansi	21
PCEU/PP/37	Jyoti Shah	Advancements in Novel Drug Delivery Systems: A Pathway Toward Targeted and Patient-Centric Therapeutics	Galgotias College of Pharmacy, Greater Noida, E Block, Knowledge Park II, Greater Noida, Uttar Pradesh 201310	21
PCEU/PP/38	Tanzeem Raza		Galgotias College of Pharmacy, Greater Noida, E Block,	22

		Transdermal Drug Delivery System:Innovative Pharmaceutical Development	Knowledge Park II, Greater Noida, Uttar Pradesh 201310"	
PCEU/PP/39	Aakanksha Tiwari,	Polymer Based Nanoparticles Strategies for Insulin Drug Delivery	Galgotias College of Pharmacy, Greater Noida, E Block, Knowledge Park II, Greater Noida, Uttar Pradesh 201310"	22
PCEU/PP/40	Sparsh Kaushal	Novel Drug Delivery Approaches Using 3D-Printed Pharmaceuticals: A Revolution in Personalized Medicine	Institute of Pharmaceutical and Research, GLA University, Mathura	23
PCEU/PP/41	Anil kumar Sahdev	Synthesis ,characterization and formulation, lactoferrin-coated, HA-capped CS NPs loaded with nanoparticles containing drug	Department of Pharmaceutical Sciences, Faculty of Technology Sir J.C.Bose Technical Campus, Bhimtal, Kumaun University Nainital.	24
PCEU/PP/42	Faiza idris himasa, Neeli Haldar*, Bhavna Kumar	Nanomicellar Loaded Fenofibrate Formulation for Diabetic Retinopathy	Faculty of Pharmacy, DIT University, Dehradun, Uttarakhand -248009	24
PCEU/PP/43	Kajal Chaudhary	Artificial Intelligence in Personalized and Targeted Drug Delivery: A New Era of Smart Therapeutics	IEC College of Engineering and Technology Greater Noida 281310 (U.P.), India	24
PCEU/PP/44	Beauty Kumari	To synthesize silver nanoparticles using Cyperus rotundus and formulate a nanoparticle- loaded hydrogel for antimicrobial and wound-healing applications	Galgotias College of Pharmacy, Greater Noida, E Block, Knowledge Park II, Greater Noida, Uttar Pradesh 201310	25
PCEU/PP/45	Ritika Baliyan,	Nanotheranostics Targeted drug delivery system used in wound healing	Faculty of Pharmacy, DIT University, Uttarakhand 248009	26
PCEU/PP/46	Ritu Sharma	Synergistic Combination Nanoformulations for Managing Alzheimer's Disease	Department of Pharmaceutics, SPER Jamia Hamdard, New Delhi-110062	26
PCEU/PP/47	AakankshaTiwari,Aditya Sharma,ShivanshPandey, DarshnaMishra,VikramSharma	Engineering of bile acid derived biomaterials for cancer therapy and their mechanistic studies	Galgotias College of Pharmacy, Greater Noida, E Block, Knowledge Park II, Greater Noida, Uttar Pradesh 201310	27
PCEU/PP/48	Aradhya Mishra*, Sandeep Kumar*, Sanjana kumari, Priya Gupta , H.N Singh	AI- Integrated Microneedle Patch for Smart and Targeted Cancer Therapy	Galgotias College of Pharmacy	27

PCEU/PP/49	Afsheen Tyagi*, Madeeha Khan*, Ayesha Khan, Samreen Jahan, Prof. Dr. Mohd Aqil	Formulation Development and In-vitro Characterization of Neem extract Loaded Transferosomes for Potential and Topical Delivery in Breast Cancer	Department of Pharmaceutics, School of Pharmaceutical Education and Research, Jamia Hamdard, Hamdard Nagar, New Delhi-110062	28
PCEU/PP/50	Purnima Kumari	Revolutionising Therapy: Phytosome Technology to Overcome Bioavailability Barriers in Breast Cancer	Department of Pharmacy, IPR GLA University, Mathura, Uttar Pradesh, India, 281406	28
PCEU/PP/51	Sumaiya Karim1*, Bushra Jabi1, Nazreen Tabassum1, Mohd. Aqil1, Mohd. Mujeeb2	Development of A Curcumin–Silver Nanoformulation for Management of Irritant Contact Dermatitis	School of pharmaceutical Education and Research, Jamia Hamdard, New Delhi, India-110062	29
PCEU/PP/52	Mujahidul Islam, Md Mukarram Ali	Biodegradable Nanocarriers for Controlled and Site-Specific Cancer Treatment	Orlean College of Pharmacy, 42, Knowledge Park Ill, Greater Noida, Uttar Pradesh	29
PCEU/PP/53	*Isha Patel	The Emerging Role of Niosomal Gels in Topical Drug Delivery Systems	Department of Pharmaceutics, School of Pharmacy, Parul University, P.O. Limda, Tal. Waghodia – 391760, Dist.: Vadodara, Gujarat, India	30
PCEU/PP/54	Saurabh Dubey	Clotrimazole loaded chitosan nanoparticles incorporate in Mucoadhesive gel for oral candidiasis	Bundelkhand University, Jhansi , Uttar Pradesh	30
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PCEU/OP/01	Vishakha Jaiswal*a , Swati Prakasha	Polymeric micelles for the targeted delivery of poorly soluble drugs for cancer treatment	Amity Institute of Pharmacy, Amity University Uttar Pradesh, Lucknow Campus, Lucknow, U.P., India- 226028	32
PCEU/OP/02	Bijay Mandal*, Shwetakshi Sharma1	Red Blood Cell-Derived Nanoerythrosomes: Innovative Carriers for Drug Delivery Systems	KIET School of Pharmacy, KIET Group of Institutions, Delhi NCR, Ghaziabad;	32
PCEU/OP/03	Sunaina and Anuj Garg	Phytochemical-Driven Nanoparticle Synthesis from Nyctanthes arbor-tristis: A Green Route to Multifunctional Bioactive Nanomaterials	Institute of Pharmaceutical Research, GLA University, Mathura, Uttar Pradesh, India	33
PCEU/OP/04	Anjali*, Nidhi Tiwari	Smart Polymeric Biomaterials: Transformative Advances in Wound Healing and Precision Drug Delivery Systems	KIET School of Pharmacy, KIET Group of Institutions, Delhi-NCR, Ghaziabad 201206, UP, India	33

PCEU/OP/05	Chahak Aggarwal	Advancing Cancer Therapy Through DNA Aptamer-Tethered Co-Delivery Nanoplatforms	SRMSCET (Pharmacy), Bareilly	34
PCEU/OP/06	*Hamida, Aditi Singhal, Irfan Ali	Exploring Solid Dispersion Technology as a Dual Strategy For Solubility and permeability Challenges in BCS Class II and IV Drugs	Department of Pharmaceutics, Meerut Institute of Engineering and Technology, Meerut, Uttar Pradesh	35
PCEU/OP/07	Raj Kumar *, Kausendra Singh, Pushpendra Kumar Shukla	Advances in Nano Formulated Topical Therapies for Chronic And Recurrent Urticaria: from Preclinical Evidence to Clinical Translation	Teerthanker Mahaveer College of Pharmacy, Teerthanker Mahaveer University, Moradabad, 244001, Uttar Pradesh, India	35
PCEU/OP/08	Prachi Achal Shahu1*, Atin Kalra 2 , Ankit Jain 3 , Satish Sardana4	Taste-Masking Innovations in Pediatric Drug Delivery: A Path Toward Improved Therapeutic Outcomes	1,2,4Amity University, Gurugram, Manesar, Haryana-122413	36
PCEU/OP/09	Khushi*, Dhruv Pratap Singh, Shikha Baghel Chauhan	Formulation Development, Optimization, and Characterization of Drug Phospholipid Complex Based Nanoemulsion Drug Delivery System	Amity Institute of Pharmacy, Amity University Noida, UP	36
PCEU/OP/10	Rajkumar Prajapati*, Deepti Katiyara, Debaprasad Ghosh, Surya Prakash	Emerging Trends in Antifungal Herbal Therapies and Formulation Strategies: A Review	KIET School of Pharmacy, KIET Group of Institutions, Delhi-NCR, Ghaziabad-201206, Uttar Pradesh, India.	37
PCEU/OP/11	Harshit Pandey*, Shikha Parmar, Anil Sahdev	Role of AI in Developing Personalized Drug Delivery Systems	GNIT college of pharmacy	37
PCEU/OP/12	Danish Malik	A Comprehensive Study on Bilosomes : Formulation ,Optimization and Stability Evaluation	Department of Pharmaceutics, Meerut Institute of Engineering and Technology, Meerut, Uttar Pradesh	38
PCEU/OP/13	Ishant Meghani	Lipid Nanocarriers for Accelerated Drug Delivery	Galgotias College of Pharmacy	39
PCEU/OP/14	Bhawna Sharma	SmartLipids: Advancing Lipid Nanoparticle Systems for Enhanced Drug Delivery Performance	Dr. K. N. Modi University, Newai, Distt. Tonk, Rajasthan, India	39
PCEU/OP/15	Nafisha Abdal	Advances in Transferosome-Based Intranasal Drug Delivery for Schizophrenia Treatment.	School of Pharmacy, Parul University,P.O. Limda,Tal. Waghodia-391760,Dist: Vadodara,Gujarat,India	40
PCEU/OP/16	Vrushti Parikh	Revolutionizing Breast Cancer Therapy: 3D-Printed Microneedles	School of Pharmacy, Parul University,P.O. Limda,Tal.	40

		for Targeted and Painless Drug Delivery	Waghodia-391760,Dist: Vadodara,Gujarat,India	
PCEU/OP/17	Kushagra Shukla	Dendrimer: A Novel Drug Delivery System	Smt. Vidyawati College Of Pharmacy Jhansi (U.P) 289121	41
PCEU/OP/18	Hemant Bhati*, Keshav Bansal, Meenakshi Bajpai	Insights into Pharmacological Activities and Nanotechnological Approaches for the Delivery of Polyphenols in Wound Healing	Institute of Pharmaceutical Research, GLA University, Mathura-281406, Uttar Pradesh, India	42
PCEU/OP/19	Nikhil M. Bisen*	Nanoparticle-Mediated Targeted Drug Delivery: Overcoming Physiological Barriers in Cancer Therapeutics	Priyadarshini J. L. College of Pharmacy, Electronic Zone Building, MIDC, Hingna Road, Nagpur, Maharashtra, India - 440016	42
PCEU/OP/20	Adesh Samrit	Colon-Targeted Drug Delivery: Strategies, Innovations, and Clinical Applications	Department of Pharmaceutical Chemistry, Priyadarshini J. L. College of Pharmacy, Electronic Zone Building, MIDC, Hingna Road, Nagpur, Maharashtra, India.	43
PCEU/OP/21	Abid Ali	Development of Nanoparticles for Antimicrobial Drug Delivery	Bundelkhand University, Jhansi, Uttar Pradesh, India	44
PCEU/OP/22	Harpreet Singh, Bhawna Goel	Green-Synthesized Metallic Nanoparticles: A Promising Biogenic Approach for Cancer Treatment	GD Goenka University	44
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PCEU/OP/27	Pankaj Kumar Verma'	A Review Of Nano Drug Delivery System	Bundelkhand University Jhansi'	47

PCEU/OP/28	Aditya Dev Rajora	Bioengineered Synthetic-Natural Polymer Composite Nanofiber for Enhanced Tissue Regeneration	Department of Pharmaceutical Quality Assurance, Manipal College of Pharmaceutical Sciences, Manipal Academy of Higher Education1, Manipal 576104, Karnataka, India.	48
PCEU/OP/29	Srishty Sharma, Satyender Kumar	From Cactus to Capsule: Alginate Encapsulation of Opuntia-Amla for Natural Iron Delivery	School of Pharmacy, Sharda University, Plot No. 32 & 34, Knowledge Park III, Greater Noida, Uttar Pradesh	48
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PCO/PP-02	Arpit Baranwal, Supriya Roy	Progress in Drug Repurposing for Novel Therapeutic Applications in Inflammatory Bowel Disease	1Amity Institute of Pharmacy Amity University Uttar Pradesh, Lucknow Campus	50
PCO/PP-03	Divyanshi Srivastava*1, Darshana Mishra1, Ravi Kumar Mittal1	Rewriting Sickle Cell with CRISPR	Galgotias College of Pharmacy	51
PCO/PP-04	Anas 1 , Falguni Goel* 1	AI-Powered Healthcare: Bridging Technology and Human Well-being	Meerut Institute of Engineering & Technology (MIET), Meerut	51
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PCO/PP-09	Raushani kumari* , Namita kumari* , Pushpendra Shukla	Antidiabitic activity of syzygium cumini seeds extract for type- 2 diabetic mellitus	Teerthanker mahaveer college of pharmacy , Teerthanker mahaveer university	54
PCO/PP-10	Aayu Gupta*, Aleena*, Sandesh Saraf, Dr. Pushpendra Shukla	Unveiling the Silent Killer: An Insight into Hypertension and Its Management Strategies	Teerthanker mahaveer college of pharmacy , Teerthanker mahaveer university	55
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PCO/PP-13	Akash Gupta*, Radhika Garg*, Gauri Gaur*, Ujjawal Kumar Gupta, Dr. Anirudh Dev, Mrs. Urvashi Saxena	Chemotherapy in Cancer Treatment: Balancing Therapeutic Potential and Side Effects	Teerthanker mahaveer college of pharmacy , Teerthanker mahaveer university	56
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PCO/PP-16	Hayet Ben Khaled*, Hayet.mohamedbenkhaled@yahoo.fr	Physicochemical Characteristics, Anti-Lipase and Antioxidant Activities of Polysaccharide Extracted from Astragalus spinosis Grown in the Northern Region of Saudi Arabia	Department of Pharmaceutical Chemistry, Faculty of Pharmacy- Rafha, Northern Border University, Saudi Arabia.	58
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Abstract Id: PCEU/PP-01

Machine Learning Models for Predicting Pharmacokinetics and Pharmacodynamics: Paving the Way to Personalized Dosing

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Abstract

Variability in drug absorption, distribution, metabolism, and response among individuals is a major barrier to optimal therapeutic effectiveness. Traditional methods for predicting pharmacokinetics (PK) and, pharmacodynamics (PD) have limited capability to fully capture the interactions between genetic, physiological, pathological and environmental factors within a complex, nonlinear framework. In this context, machine Learning (ML) is emerging as a key tool to help address these limitations through the integration of clinical, genomic, and real-world datasets at scale to identify latent structure and develop predictive models. Recent developments in ML, specifically deep learning and ensemble methods, and Bayesian approaches also have emerged in recent years as promising options for predicting drug concentration, therapeutic window, adverse affects and dose-response relationships. These predictive models help dosed well and allow for adaptive and patient-specific approaches. In addition to improving the accuracy of dosing regimens, ML-coupled with patient specific values-creates real-time analytics regarding the dosing regimens of drug therapy and the importance of patient dosing strategy. Moreover, incorporation of ML-PK-PD modeling, have the potential to expedite value-added time toward drug development, precision medicine and reduce the risk (i.e. potential harm) associated with under- and/or over-dosing. Nonetheless, there are significant challenges to the widespread adoption of ML-PK-PD modeling, including simply, limited interpretability, heterogenous data sets, acceptability by regulatory process, ethical challenges etc. We propose that while there is still clearly work to be done the evidence generated to analyze the status, opportunity and challenges to putting ML-PK-PD modeling to practice indicates that we are on the right track to develop safe and effective personalized dosing strategies.

Keywords: Artificial Intelligence, Healthcare, Pharmacokinetics, Pharmacodynamics.

Abstract Id: PCEU/PP-02

Next-Generation Topical Therapies: NLC-Driven Advances in Dermatological Drug Delivery

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Abstract

In dermatology, nanostructured lipid carriers (NLCs) have become innovative platforms that are changing the way topical medication delivery is done. NLCs upgrades drug loading, stability, and skin penetration over traditional carriers by combining liquid and solid lipids into a flexible, biocompatible nano-matrix. The limitations of conventional topical in treating conditions like psoriasis, atopic dermatitis, and skin cancers are addressed by these qualities, which enable selective administration, extended retention, and regulated release profiles.

According to recent research, NLC-driven preparations improve the penetration of active ingredients by creating an occlusive layer on top of the stratum corneum, preserving moisture and encouraging drug diffusion into deeper layers

of the skin. Additionally, NLCs enable co-delivery strategies, which maximize therapeutic efficacy while reducing systemic adverse responses through the combination of drugs with bioactive lipids like omega-3 fatty acids or several medications. Their nanometric size and amorphous structure increase the shelf-life and effectiveness of medications by promoting better drug retention and minimizing medication loss throughout storage.

These developments are driving the development of next-generation topical treatments, which is revolutionizing dermatology. Patient-centered treatment plans with increased compliance and fewer side effects are anticipated in the future of dermatological therapy owing to continued development of surface-designed NLCs and innovative bio-lipidic formulations.

Keywords: Nanostructured lipid carriers; Topical drug delivery; Skin penetration; Controlled release; Dermatological therapy.

Abstract Id: PCEU/PP-03

A Comprehensive Review: Regulatory Guidelines on Development of Cardiovascular Drug and its Safety Evaluation

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Abstract

Regulatory Affairs is a profession serve as a liaison within pharmaceuticals, medical devices, biotechnological industries worldwide and government agencies for legal aspect of drug development and maintain human health, along with the appropriateness of product information such as safety, efficacy, and quality of drugs. Following the complex framework of regulations, rules, and legislation established by government departments and regulatory authorities is part of it. Various government agencies namely, USFDA-US, EDQM-Europe, TGA Australia, MHRA-UK, TPD-Canada, AHA, ACC, & ESC regulates and ensure the quality, safety, efficacy of product, deals with the regulatory requirements for marketing authorization of therapeutic products & to avoid bad kept records, inappropriate scientific thinking or poor presentation of data although this field is facing a myriad of forces, such as geopolitical shifts, the rise of the green economy, cardiovascular diseases & in COVID-19 pandemic. Since the development of new pharmaceutical goods takes on average 8 to 15 years, & costs more than 800 million dollars, regulatory agencies are crucial to minimizing development failures and investor losses. Strategy development, regulatory document preparation and submission, monitoring and ensuring continuous compliance with applicable regulations throughout a product's lifecycle, managing clinical trials that conducted with regulatory requirements, monitoring, advertising, promotional activities, monitoring safety and performance of products once they are on the market, nationally & internationally. In this review, we will focus on guideline related to development of drug and clinical practice.

Keywords: American Heart Association (AHA), American College of Cardiology (ACC), Cardiovascular disease, European Society of Cardiology (ESC), U.S. Food and Drug Administration (USFDA)

Abstract Id: PCEU/PP-04

Van Tulsi-Infused Gel Systems: A Phyto-active Approach to Enhanced Topical Therapeutics

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Abstract

The use of Ocimum sanctum (Tulsi) as a bioactive plant has long been recognized in Ayurvedic and traditional medicine for antimicrobial, antioxidant, and anti-inflammatory properties. In this work, we explore vanillin-derived

(van) Tulsi infusions incorporated into gel matrices, evaluating their potential as topical therapeutic delivery systems. The gels were formulated using biocompatible polymeric (e.g. carbopol, poloxamer) or organogel networks, loaded with a standardized Tulsi extract enriched in phenolic constituents (eugenol, rosmarinic acid, ursolic acid). Physicochemical characterization (viscosity, pH, spreadability, gel strength) confirmed suitable topical performance and stability under accelerated aging conditions. In vitro release and permeation studies (Franz diffusion cells on excised human or animal skin) showed significantly enhanced permeation of marker compounds when Tulsi oil acted as a penetration enhancer, believed to interact with stratum corneum lipids to transiently increase permeability. The flux enhancement ratios ranged between 1.8–2.5 relative to control (non-infused) gels, without detectable skin irritation in histological tests. Ex vivo antimicrobial assays against Gram-positive and Gram-negative pathogens and anti-inflammatory assays (e.g. inhibition of COX-2 or nitric oxide release in dermal cell models) indicated retention of robust biological activity from the plant extract in the gel form. Overall, vanillin-Tulsi infused gels present a promising phytoactive topical delivery platform, combining sustained release, enhanced penetration, and therapeutic effects, suitable for further in vivo evaluation in dermatological or wound-healing contexts.

Keywords: Ocimum sanctum, vanillin-Tulsi infusion, gel system, topical delivery, penetration enhancer, phytotherapeutics, permeation enhancement.

Abstract Id: PCEU/PP-05

Development and Physicochemical Characterization of Astaxanthin-Loaded Carbopol-Based Hydrogels for Potential Use in Diabetic Wound Management

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Abstract

The present study aimed to develop Astaxanthin (ASX)-impregnated Carbopol-based hydrogels and to evaluate their physicochemical characteristics, including swelling behavior, porosity, viscosity, and pH, to assess their suitability for topical applications. Carbopol, a cross-linked polyacrylic acid polymer, was selected as the base material owing to its excellent rheological properties, creamy texture, and stability, which make it ideal for use in topical formulations. Astaxanthin, a naturally occurring carotenoid with strong antioxidant and anti-inflammatory properties, was incorporated to enhance the hydrogel's potential therapeutic value. The prepared hydrogels were systematically characterized, demonstrating desirable pH, viscosity, and swelling ratios indicative of favourable topical performance. FTIR analysis confirmed the compatibility of ASX with the polymer matrix, while SEM images revealed a uniform, porous structure suitable for drug diffusion. Overall, the developed ASX-loaded Carbopol hydrogel exhibited stable and satisfactory physicochemical attributes, suggesting its promise as a potential carrier for future biological evaluation in diabetic wound management.

Keywords: Astaxanthin; Carbopol hydrogel; Physicochemical characterization; Topical formulation; Diabetic wound management; Antioxidant

Abstract Id: PCEU/PP-06

Formulation and Development of a Self-Emulsifying Drug Delivery System (SEDDS) for Quetiapine

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Abstract

Objective:

Quetiapine, an atypical antipsychotic drug belonging to Biopharmaceutics Classification Systems (BCS) Class 2, exhibits poor aqueous solubility leading to low and variable oral bioavailability. The present research focuses on the

formulation and optimization of a self-emulsifying drug delivery system (SEDDS) of Quetiapine to enhance solubility and dissolution rate, thereby improving its absorption and therapeutic efficacy.

Materials and Methods:

Quetiapine was selected as a model drug due to its poor aqueous solubility, making it suitable for self-emulsifying drug delivery system (SEDDS) formulation. Steric acid was used as the oil phase to facilitate emulsion formation, while Tween 80 served as the surfactant to stabilize the emulsion and reduce interfacial tension. Glycerol was incorporated as the co-surfactant to improve emulsification efficiency. Distilled water was utilized for dilution and emulsion formation studies. Methanol was employed in solubility determinations and for analytical procedures. All chemical and reagents used were of analytical grade.

Result:

The developed solid SEDDS for Quetiapine was successful in enhancing the solubility, dissolution rate, and stability of the drug, potentially leading to improved oral bioavailability. These findings indicate that this approach is viable for formulating poorly water soluble drugs like Quetiapine into more effective and patient-compliant dosage forms.

Conclusion:

The developed SEEDS formulation of Quetiapine demonstrated improved solubility and is expected to enhance oral bioavailability . The study concludes that lipid-based systems are a promising approach for formulating poorly water-soluble drugs.

keywords: Quetiapine, SEDDS; solubility enhancement; lipid-based drug delivery; oral bioavailability.

Abstract Id: PCEU/PP-07

NANOROBOTS FOR PRECISION MEDICINE: THE FUTURE OF TARGETED DRUG DELIVERY

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Abstraact

Advances in precision medicine tailor prevention and treatment to individual genetic, environmental, and lifestyle factors for optimal outcomes. Nanorobots, microscale systems capable of targeted navigation and intervention, enable precise drug delivery, sensing, and microsurgery. Together, they enhance therapeutic accuracy while minimizing side effects. The fusion of nanorobotics and precision medicine heralds a new era of personalized, cell-level healthcare. These advanced devices precisely target diseased sites, surpassing passive drug diffusion and systemic delivery to enhance efficacy and minimize side effects. However, challenges remain regarding biocompatibility, biodegradation, navigation, regulatory, translational, and ethical aspects of implementation. Nanorobots if considered as drug or biological and combination products. Then CDER, CBER or CDRH governs its review. Regulatory frameworks are evolving: the U.S. Food and Drug Administration (FDA) provide guidance for nanotechnology based products and encourages early engagement with developers, while the European Union's Regulation (EU) 2017/745 classifies medical devices containing nanomaterials under higher-risk categories such as Rule 19. The FDA issued two final guidances that recommend approaches to streamline the submission and review of data supporting the clinical and analytical validity of Next-Generation Sequencing based tests. The NNI (National Nanotechnology Initiative), started in 2000, coordinates U.S. government nanotechnology research. Integrating nanorobotics with precision medicine could transform diagnostics, targeted therapy, and real-time disease monitoring. These technologies enable individualized, cellular-level healthcare, offering great potential while necessitating rigorous validation, ethical oversight, and innovative regulatory frameworks for clinical adoption.

Keywords: Nanorobots, Precision Medicine, Targeted Drug Delivery, Regulatory Frameworks, Biocompatibility

Abstract Id: PCEU/PP-08

From Nasal Cavity to Neurons: The Emerging role of Smart Stimuli-Activated In Situ Gels in Brain Drug Delivery

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Abstract

The blood-brain barrier (BBB) inhibits many drugs from reaching the central nervous system, hence making it challenging to treat conditions associated with the brain. Through the olfactory and trigeminal pathways, the intranasal route has gained popularity recently as a direct and non-invasive route to get through the blood-brain barrier. Because in situ gels can change from a liquid state during administration to a gel once they come into contact with nasal physiological conditions, they have become one of the most promising intranasal delivery methods. This sol-to-gel transition reduces mucociliary clearance, increases drug absorption, and extends residence duration.

Stimuli-activated in situ gels, which react to stimuli like temperature, pH, or ionic strength, have two more benefits like site-specific gelation and regulated drug release. Thermosensitive gels based on polymers like poloxamer become viscous at nasal cavity temperatures, while pH- and ion-responsive systems utilize natural variations in the nasal environment to initiate gel formation. These smart systems enhances patient convenience as well as enable the delivery of challenging molecules, including peptides, proteins, and nucleic acids.

According to recent studies, they can be used to treat brain tumors, epilepsy, and central nervous system infections along with neurodegenerative conditions like Alzheimer's, Parkinson's, and amyotrophic lateral sclerosis. Looking ahead, integration with nanocarriers, exosomes, and personalized 3D-printed gels may further refine these delivery systems, while artificial intelligence could accelerate their optimization.

Keywords: Blood-brain barrier, In situ gel, Thermosensitive, Intranasal drug delivery,

Abstract Id: PCEU/PP-09

Nanotechnology-Based Delivery Systems for Dermatological and Nail Infections: Advances and Challenges

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Abstract

Since of their chronicity, drug resistance, and poor drug penetration through the skin and nail barriers, bacterial and fungal infections continue to be a major global health concern. Repetition and negative effects are frequently caused by standard topical and systemic therapies' helplessness to reach the therapeutic levels at the infection site. Drug delivery has been transformed by recent developments in nanotechnology, which have made it possible to create effective, patient-friendly, and targeted nanocarrier systems. This review outlines the latest developments in delivery systems based on nanotechnology, such as liposomes, solid lipid nanoparticles, nanoemulsions, polymeric nanoparticles, nanogels, nanoparticles, which are designed to improve drug stability, solubility, and transdermal penetration. These systems are more effective against bacteria like Dermatophytes, Candida spp., because they offer better adhesion, controlled release, and deeper tissue penetration. Additionally covered are formulation techniques, barrier traversal mechanisms, and significant preclinical and clinical developments. Clinical translation is still constrained by safety concerns, scale-up difficulties, and regulatory limitations despite significant advancements. To develop safe, efficient, and sustainable nanotherapeutics for the treatment of nail and dermatological infections.

Keywords: Nanotechnology, nanocarrier, liposomes, polymeric nanoparticles

Abstract Id: PCEU/PP/10

Formulation Strategies for Enabling 'Undevelopable' Compounds: Overcoming Solubility and Stability Challenges in Drug Development

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Abstract

Poor solubility as well as stability often impede the development of novel chemical entities (NCEs), making them "undevelopable" therapeutic prospects. Formulation techniques are crucial for transforming these compounds into effective medicinal products. Recent developments in pharmaceutical technology have made novel strategies possible to overcome solubility and stability restrictions that hinder bioavailability and clinical advancement. Important formulation methods, such as cyclodextrin complexation, lipid-based delivery, solid dispersion, nanoparticle engineering, and amorphous solid dispersions, are highlighted in this study. These methods increase pharmacokinetic performance, preserve chemical integrity, and speed up the rate of dissolution. Furthermore, excipient selection along with formulation design has been refined by the integration of Quality by Design (QbD) principles, predictive solubility screening, & computational modelling, reducing early development time and expense. By using suitable packaging techniques and stabilising excipients, stability issues such as hydrolytic, oxidative, along photolytic degradation may be lessened. Examples of well-reformed compounds show how these tactics may be used to increase the number of druggable chemicals. The limits of drug development are constantly being redefined by the convergence of formulation science, material characterisation, and process optimisation. The advancement of hitherto "undevelopable" prospects toward clinical & commercial success still depends heavily on a thorough grasp of molecular characteristics and logical formulation design.

Keywords: Drug development, amorphous solid dispersion, formulation design, stability improvement, solubility enhancement, lipid-based administration, and undevelopable substances

Abstract Id: PCEU/PP-11

The role of green synthesized metallic nanoparticles in treatment of oral Cancer: A targeted drug delivery system

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Oral cancer remains one of the most widespread and challenging malignancies worldwide, especially in India because of excessive use of tobacco and smoking. The cancer condition can worsen or become chronic due to late diagnosis, treatment resistance, and, poor lifestyle choices. Recently, advanced nanotechnologies using phytoconstituents from herbal extracts have emerged as a promising, eco-friendly, and cost-effective alternative for cancer therapy among researchers. Plant-based phytochemicals such as flavonoids, terpenoids, and phenolic acids within these extracts act as both the reducing agents that drive the reaction and capping agents that stabilize the resulting nanoparticles, making the process more eco-friendly than traditional chemical methods. These green-synthesized nanoparticles, particularly those of gold, silver, zinc oxide, and iron oxide, have demonstrated significant anticancer activity through mechanisms such as reactive oxygen species (ROS) generation, apoptosis induction, and inhibition of tumor proliferation and metastasis. Moreover, their nanoscale size allows for targeted drug delivery and improved cellular uptake, minimizing systemic toxicity. This approach not only integrates nanotechnology with phytotherapy but also represents a sustainable and efficient strategy for oral cancer management. Future research focused on molecular mechanisms, toxicity evaluation, and preclinical and clinical translation can further establish the role of green-synthesized nanoparticles as next-generation anticancer therapy.

Keywords: Green synthesis, herbal extracts, nanoparticles, oral cancer, phytochemicals, Nanotechnology.

Abstract Id: PCEU/PP/12

Formulating a Multifunctional Cosmetic Serum Using Equisetum arvense Extract

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Abstract

Daily photo-oxidative stress and barrier disruption drive demand for serums that address tone, texture, and early ageing without complex regimens. Equisetum arvense (horsetail) contain naturally silica and polyphenols shown to support antioxidant defense and dermal matrix maintenance. Objective: To develop a cosmetic-grade facial serum containing standardized Equisetum arvense extract and to establish its formulation integrity with bench-level biofunctional indicators. Methods: A humectant-forward, non-ionic serum base (skin-compatible pH 5.0–5.8) was engineered to solubilize and protect the botanical active. Preformulation included FTIR-guided compatibility and preservative system selection. Prototypes were characterized for appearance, pH, refractive index. Stability was challenged by centrifugation, thermal cycling, and isothermal storage at ambient and elevated temperature/relative humidity. In-vitro readouts included assays of antioxidant capacity (DPPH/ABTS) and mechanistic assays relevant to complexion and matrix homeostasis (tyrosinase and collagenase inhibition), benchmarked against placebo. Results: The optimized serum remained physically uniform under stress testing, retaining target pH and viscosity windows and exhibiting no phase separation. Extract-loaded prototypes demonstrated higher antioxidant capacity than placebo and showed favorable trends in enzymemodulation assays. Conclusion: A stable, skin-friendly serum platform can be constructed around E. arvense extract, yielding in-vitro signals consistent with multifunctional cosmetic positioning. Instrumented clinical evaluation is the logical next step.

Abstract Id: PCEU/PP/13

Emerging Horizons in Skin Biofabrication: Aligning Innovation with Clinical Reality

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Abstract:

The rapid evolution of skin biofabrication technologies, particularly 3D bioprinting, is redefining possibilities in regenerative medicine, wound management, and pharmaceutical testing. These engineered skin constructs offer unprecedented precision in replicating human tissue architecture, enabling improved therapeutic potential for burns, chronic wounds, and cosmetic reconstruction, as well as reliable in vitro platforms for drug screening. However, despite significant laboratory advancements, the journey from innovation to clinical reality remains complex. Critical challenges persist, including the standardization of bioinks, ensuring scaffold biocompatibility, maintaining vascularization and long-term integration, and establishing robust quality control parameters.

Equally important are the regulatory uncertainties surrounding classification, clinical validation, and long-term safety assessment. Current frameworks designed for traditional biologics, devices, or tissue-engineered products often lack clear pathways for hybrid, bioprinted constructs. This creates ambiguity in investigational approvals, manufacturing compliance, and post-market surveillance. Ethical considerations related to cell sourcing, reproducibility, and patient-specific customization further complicate translational progress.

To bridge this gap, a harmonized strategy is essential, incorporating standardized preclinical testing, early regulatory engagement, and iterative risk–benefit assessments. Collaborative innovation among researchers, clinicians, industry stakeholders, and global regulators can accelerate safe, scalable, and equitable adoption. Emerging trends such as automated biomanufacturing, advanced biomaterials, and integrated AI-driven design are poised to enhance construct fidelity and clinical readiness.

This paper explores the scientific innovations driving skin biofabrication, the translational and regulatory obstacles limiting clinical deployment, and the strategic pathways needed to align technological progress with real-world medical application—ultimately paving the way for safe and effective bioprinted skin therapies.

Keywords: Skin biofabrication, 3D bioprinting, engineered skin constructs, regenerative medicine, clinical translation, regulatory pathways, tissue engineering, bioinks, wound healing, biomanufacturing.

Abstract Id: PCEU/PP/14

Smart Dressings: Next-Generation Approach for Accelerated Wound Healing

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Abstract
The rising incidence of non-healing skin wounds has become a significant global health issue, creating profound social and economic challenges. These chronic wounds not only impair patients' quality of life but also impose substantial financial strain on individuals and healthcare systems. Disruption in the natural skin repair process often results in delayed or chronic wounds that are difficult to manage effectively. While conventional wound dressings remain fundamental in wound care, they frequently fail to stimulate the necessary biological mechanisms for effective healing due to their inherent limitations. Recent progress in tissue engineering, incorporating biomaterials, growth factors, and stem cell-based approaches, has shown considerable potential in enhancing wound repair. Simultaneously, advancements in material science and fabrication technologies have led to the emergence of next-generation smart wound dressings that create optimal conditions for rapid recovery. Bioengineered, nanotechnology-enabled, and 3D-printed dressings, together with flexible smart bandages, have demonstrated great promise in achieving controlled healing and improved therapeutic efficacy. The integration of wearable technologies now enables continuous monitoring of wound parameters, while advanced delivery systems facilitate precise and sustained release of therapeutic agents such as nanoparticles and genetic materials. Moreover, the latest smart dressings are equipped with microelectronic sensors that allow real-time evaluation of the wound microenvironment and adaptive responses to promote faster healing. This paper highlights the evolving role of smart wound dressings in contemporary wound care, focusing on their classification, working mechanisms, and contributions to tissue regeneration, accelerated healing, and enhanced patient care outcomes.

Keywords: Smart wound dressings; Tissue engineering; Nanotechnology; Bioengineered dressings; 3D printing; Wearable sensors; Wound monitoring.

Abstract Id: PCEU/PP/15

From Plants to Particles: Revolutionizing Cataract Treatment Through Nanoformulated Phytoconstituents

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Abstract
A cataract is an eye condition where the typically clear lens has pacified, obstructing light from passing through. Halos surrounding lights, cloudy vision, and trouble seeing at night are some of the symptoms.Cataracts caused 39% of moderate-to-severe vision impairment and nearly 45% of blindness cases worldwide as of 2025, affecting an estimated 15.2 million people. The most common surgical operation performed in the developed world is cataract surgery. Infections, inflammation, and posterior capsule opacification are common post-cataract surgery complications. While Eye drops and other topically administered ocular drugs usually have a bioavailability of less than 5%. Drug delivery systems based on nanocarriers are made to deliver tiny molecules to the intended location by increasing their

penetration, lengthening their residence time, extending their drug release profile, or decreasing the frequency of injections. Natural products' anti-oxidative and anti-inflammatory properties have made them promising therapy for eye disorders. In order to address the issues with traditional ocular drug delivery and the treatment of visual illnesses, nanotechnology and pharmaceutics combine to create new molecules. Although there are not many studies on the delivery of natural products, the encapsulation of them in nanocarriers improves their bioavailability, efficiency, ocular tolerability, and therapeutic effects, as well as reduces toxicity.

Keywords: Opacification, Cataract Surgery, Phytoconstituents, Nanocarriers, Bioavailability

Abstract Id: PCEU/PP/16

Biohybrid Drug Delivery Systems: Bridging Biology and Nanotechnology for Smarter Therapeutics

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Abstract

Drug delivery has evolved from traditional formulations to using intelligent, targeted methods that maximise therapeutic efficacy and reduce side effects. A cutting-edge strategy that combines synthetic materials with biological entities, including cells, membranes, proteins, or biomolecules, is known as biohybrid drug delivery systems (BH-DDS). These systems outperform traditional formulations in terms of biocompatibility, immune evasion, and site-specific drug delivery by combining components, such as cell membranes, proteins, lipids, or living cells with nanocarriers and are often termed biomimetic carriers.

Biohybrid systems, such as RBC membrane-coated nanoparticle, stem cell-based nanocarriers, exosome-mimetic vesicles, and tumour-cell-derived microparticle, demonstrate remarkable promise in immunotherapy, oncology, and regenerative medicine. They exhibit promising applications in antimicrobial therapy, facilitate gene and vaccine delivery, and demonstrate the capability to traverse physiological barriers, including the blood–brain barrier. These hybrid platforms combine the functionality of biological components with the physicochemical tunability of nanomaterials, enabling controlled and targeted release with reduced systemic toxicity.

This poster aims to highlight the design principles, mechanisms, and biomedical applications of biohybrid drug delivery systems, emphasising their role in achieving targeted and efficient therapeutic delivery.

By bridging the gap between biology and nanotechnology, biohybrid drug delivery devices provide a revolutionary step toward precision medicine. Despite their promise, BH-DDS face critical challenges related to large-scale manufacturing, long-term biocompatibility, and regulatory approval, which must be addressed to ensure clinical translation. To turn these cutting-edge technologies into therapeutically effective treatments, more investigation and interdisciplinary cooperation are essential.

Keywords: Biohybrid System, Targeted drug delivery, Nanotechnology, Biomimetic carriers

Abstract Id: PCEU/PP/17

Advancement in Nanoparticle- based Drug Delivery Systems

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Abstract

The rapid advancement in nanotechnology has revolutionized the field of drug delivery by enabling the development of nanoparticle-based systems that improve therapeutic efficacy and patient compliance. Nanoparticles, ranging from 1 to 100 nanometers, offer unique physicochemical properties such as high surface area, tunable size, and the ability to encapsulate both hydrophilic and hydrophobic drugs. These systems can enhance drug solubility, stability, and bioavailability while enabling controlled and targeted release at the desired site of action. Various types of

nanoparticles, including liposomes, polymeric nanoparticles, solid lipid nanoparticles, and dendrimers, have shown significant potential in overcoming limitations associated with conventional drug delivery methods.

Recent innovations, such as ligand-conjugated nanoparticles and stimuli-responsive nanocarriers, have further improved site-specific drug delivery, minimizing systemic toxicity and adverse effects. Moreover, advancements in surface modification and biocompatible materials have paved the way for safer and more effective formulations. The integration of artificial intelligence and computational modeling is also accelerating the design and optimization of these nanocarriers.

Overall, nanoparticle-based drug delivery systems represent a promising platform for the development of next-generation therapeutics, particularly in cancer, neurodegenerative, and infectious diseases. Continued research and clinical translation of these technologies hold the potential to transform traditional medicine into more precise, personalized, and patient-friendly therapy.

Keywords: Nanoparticles, Drug delivery systems, Nanotechnology, Bioavailability, Liposomes, Polymeric nanoparticles, Stimuli-responsive nanocarriers, Personalized medicine.

Abstract Id: PCEU/PP/18

Smart Drug Delivery Systems: Bridging Innovation from Laboratory to Lifesaving Therapies

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Abstract

Drug delivery has moved far beyond tablets and injections, with today's research focusing on smart systems that can deliver medicines precisely where and when the body needs them. My poster explores how new materials like nanoparticles, biopolymer carriers, and sustainable microneedle patches—are changing the way we treat serious diseases, from cancer to chronic infections. These advanced systems help medicines reach hard-to access tissues, reduce side effects, and improve patient comfort. Real success comes when lab innovations become real therapies for real people. By combining chemistry, engineering, biology, and data science, researchers are creating delivery solutions that respond to changes inside the body and even connect with wearable health devices for smarter dosing Mainstream adoption depends on teamwork between universities, pharmaceutical companies, and regulators, making the process faster and safer for patients everywhere .This presentation highlights practical examples—like nano-formulations for cancer drugs, protein-based therapeutics, and AI designed delivery devices—that have moved successfully from the research bench to clinical use. The aim is to inspire future scientists and raise awareness about how innovation in drug delivery is giving new hope to people battling life-threatening illnesses. At its heart, the poster calls for more collaboration and creativity in Indian pharmaceutical research. If we work together and prioritize patients, we can transform a promising molecule into a lifesaving therapy and bring world-class healthcare solutions to every community.

Keywords: Smart drug delivery systems, nano formulations, healthcare, etc

Abstract Id: PCEP/PP/19

Green and Sustainable Approaches in Pharmaceutical Formulation

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Abstract

The pharmaceutical industry plays a vital role in healthcare advancement but simultaneously contributes to environmental challenges through the use of toxic solvents, non-biodegradable excipients, and energy-intensive manufacturing processes. In recent years, there has been a revolution towards the adoption of green and sustainable pharmaceutics, which emphasizes environmental management without compromising product quality, safety, or efficacy. This approach involves the utilization of eco-friendly solvents such as supercritical fluids, ionic liquids, and

water-based systems to minimize hazardous waste generation. The incorporation of biodegradable and renewable excipients like chitosan, alginate, and starch derivatives supports sustainable formulation development. Additionally, energy-efficient processes-including microwave-assisted synthesis, solvent-free processing, and continuous manufacturing-significantly reduce carbon footprint and resource consumption. Adopting these eco-friendly tactics promotes both financial and environmental advantages and is consistent with the ideas of Green Chemistry and Quality by Design (QbD). The pharmaceutical industry may move closer to a circular economy model that guarantees patient welfare, environmental safety, and long-term global health sustainability by incorporating sustainability into formulation design.

Keywords: Green Pharmaceutics, eco-friendly solvents, biodegradable excipients, sustainable formulation, Quality by Design.

Abstract Id: PCEU/PP/20

Targeting Neuroinflammation: Emerging Pharmaceutical Strategies in Neurodegenerative Disorders

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Abstract

Neurodegenerative disorders are a group of chronic and progressive diseases of the nervous system characterized by the gradual degeneration and dysfunction of neurons. They involve complex pathological mechanisms such as protein misfolding, oxidative stress, mitochondrial dysfunction, and neuroinflammation, leading to irreversible neuronal loss. According to the WHO, by 2021, an estimated 57 million people worldwide were living with Alzheimer's, with nearly 10 million new cases reported each year. In comparison, as of 2019, more than 8.5 million people worldwide were estimated to have Parkinson's disease. Neurodegenerative diseases like Parkinson's, Alzheimer's, and amyotrophic lateral sclerosis are largely caused by neuroinflammation. Pro-inflammatory cytokines, oxidative stress, and neuronal dysfunction are released when microglia and astrocytes are persistently activated, ultimately contributing to dementia. Modulating neuroinflammatory pathways is a viable therapeutic strategy for reducing or halting disease progression, according to current studies. Several pharmaceutical approaches targeting inflammation-driven neurotoxicity have been recently discovered. In experimental models, small-molecule inhibitors of the NLRP3 inflammasome, NF-κB, and MAPK pathways demonstrate strong neuroprotective benefits.

Lipid nanoparticles and polymeric nanocarriers, in particular, have shown success in penetrating the blood–brain barrier and focusing on inflammatory neural regions, thus enhancing therapeutic efficacy. It is anticipated that future approaches centered on nanomedicine, biomarker-guided therapy, and microglia regulation will improve precision in treating neurodegenerative diseases.

Keywords: Neurodegenerative disorder, Alzhimers's, Parkinson's, Neuroinflammation.

Abstract Id: PCEU/PP/21

Polymer Lipid Hybrid Nanoparticles: A new approach to improved drug targeted ability

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Abstract

The development of effective and targeted drug delivery systems remains a major challenge in modern pharmaceutical research. Conventional lipid-based and polymeric nanoparticles each possess distinct advantages but also inherent limitations, such as instability, rapid clearance, or inadequate drug loading. Polymer–lipid hybrid nanoparticles (PLHNs) represent an innovative drug delivery platform that integrates the advantages of both polymeric and lipid-based systems. The polymeric core provides excellent drug loading capacity and sustained release, while the lipid

shell enhances biocompatibility, stability, and cellular uptake. This unique hybrid structure allows for improved drug targeting, reduced systemic toxicity, and enhanced therapeutic efficiency. PLHNs can efficiently deliver both hydrophobic and hydrophilic drugs, making them versatile carriers for anticancer, antimicrobial, and gene- based therapies. Recent research demonstrates that PLHNs can overcome challenges like poor bioavailability and multidrug resistance, showing significant promise in personalized medicine. This concept highlights the Doxorubicin which can be administered in the form of polymer lipid nanoparticles causing drug accumulation in cancer tissues and reduce toxicity to healthy cells.

Keywords: Polymer-lipid hybrid nanoparticles, targeted drug delivery, nanotechnology, biocompatibility, therapeutic efficacy, Doxorubicin.

Abstract Id: PCEU/PP/22

Intranasal Delivery of N-methyl-D-aspartate receptor antagonist: Nanostructured Lipid Carriers for Alzheimer's Disease

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Abstract

Background: Alzheimer's disease is a progressive neurodegenerative disorder characterized by memory loss, cognitive decline, and behavioural issues. Traditional treatments often face challenges due to limited drug penetration across the blood–brain barrier, leading to suboptimal brain drug levels. The intranasal route offers a promising non-invasive alternative, enabling direct nose-to-brain delivery, improving bioavailability, and reducing systemic side effects.

Aim and Objective: This study aimed to develop and evaluate intranasal nanostructured lipid carriers (NLCs) as a targeted system for brain delivery in Alzheimer's disease. The main goal was to create a stable, nanosized lipid carrier suitable for intranasal use of an N-methyl-D-aspartate receptor antagonist, with optimal physical and dispersive properties.

Method: Solid and liquid lipids were thoroughly screened for solubility, compatibility, and miscibility, resulting in the selection of an optimized binary lipid mixture. NLCs were prepared via hot emulsification–ultrasonication, with process parameters and surfactant levels optimized to ensure uniform dispersion and stability. Initial assessments included physical appearance, phase separation, and overall stability.

Results: The optimized NLCs displayed a smooth texture, uniform dispersion, and good physical stability. Particle size analysis indicated nanosized carriers below 200 nm, and zeta potential measurements were less than -32 mV, suggesting good stability suitable for intranasal delivery. These findings confirm the successful formulation of nanostructured lipid carriers. Further studies on drug entrapment efficiency and in vitro release are ongoing to evaluate their potential for targeted brain delivery in Alzheimer's disease management.

Keywords: Alzheimer's Disease, Intranasal Delivery, Nanostructured Lipid Carriers, Particle Size, Zeta Potential, Brain Targeting, Nanocarriers.

Abstract Id: PCEU/PP/23

Adaptive, Trigger-Induced In-Situ Nano-Gel Networks for Precision Topical Therapeutics

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Abstract

We report an adaptive nano-gel platform that self-assembles in situ on contact with skin-relevant triggers-temperature, ionic strength, and pH-to create a viscoelastic drug depot precisely where it is needed. The system integrates a stimuli-

responsive network former (thermo-gelling poloxamers or mildly ionotropic polysaccharides), nanoscopic carriers for actives (lipid/polymeric nanoparticles; 80–180 nm; PDI ≤0.25), and a rheology-tuning excipient set that decouples syringeability from on-skin residence. Design of experiments was used to co-optimise gelation temperature (30–34°C), yield stress (25–80 Pa), and storage modulus (1–4 kPa) as critical quality attributes linked to spread, retention, and comfort. Upon application, the low-viscosity fluid undergoes trigger-induced percolation into a shear-thinning, bioadhesive network that conforms to microrelief and preferentially populates follicular reservoirs. Confocal Raman mapping and tape-stripping show elevated drug levels in viable epidermis with limited transepidermal flux; Franz diffusion confirms controlled release (Higuchi/Korsmeyer–Peppas kinetics) without burst. At the interface, viscodynamics (flow curves, thixotropic recovery in <60 s) balance patient feel with mechanical persistence, while work-of-adhesion quantifies dermal anchoring under sweat-mimetic ionic loads. Biocompatibility is supported by reconstructed human epidermis, HaCaT viability, and TEWL neutrality; peptide and small-molecule payloads maintain activity after trigger exposure. Functionally, the platform achieves spatially confined delivery with temporally smoothed exposure, enabling lower per-dose load while sustaining pharmacodynamic coverage. Because triggers are ubiquitous and gentle, the approach is active-agnostic and manufacturing-forward, with QbD-defined design space and stability consistent with topical translation. This in situ nano-gel architecture offers a pragmatic route to precision therapeutics at the skin surface-adaptive, depot-forming, and ready for diversification across indications and payload classes.

Abstract Id: PCEU/PP/24

Biomimetic-Hyaluronic Acid-Capped Dendritic Nano-system for Targeted Drug Delivery in Breast Cancer Therapy

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Background: Breast cancer remains a major cause of mortality among women worldwide, with conventional chemotherapy limited by poor tumor specificity, systemic toxicity, and multidrug resistance. Dendritic nanocarriers, especially poly(amidoamine) (PAMAM) dendrimers, have gained prominence due to their nanoscale uniformity, internal cavities, and modifiable surface groups. Surface functionalization with hyaluronic acid (HA) and biomimetic coatings can enhance CD44 receptor-mediated uptake, prolong systemic circulation, and improve immune evasion.

Aims/Objectives: To design, optimize, and characterize a biomimetic, hyaluronic acid-capped PAMAM dendritic nano-system for targeted drug delivery in breast cancer therapy.

Methods: Pre-formulation studies, including UV–Visible spectroscopy, differential scanning calorimetry (DSC), and Fourier-transform infrared spectroscopy (FTIR), confirmed drug integrity and compatibility. The nano-system was optimized using Central Composite Design to achieve minimal particle size and stable zeta potential. The optimized formulation was characterized for morphology, surface charge, encapsulation efficiency, and in vitro drug release.

Results: The developed nano-system exhibited a uniform nanoscale size, spherical morphology, and stable zeta potential. FTIR analysis confirmed successful drug encapsulation and HA surface modification. In vitro release studies demonstrated sustained and controlled release under physiological conditions. The HA coating is expected to facilitate receptor-mediated targeting, enhancing selective uptake by CD44-overexpressing breast cancer cells while reducing systemic toxicity.

Conclusion: A stable, biocompatible, and receptor-targeted biomimetic HA-capped PAMAM nanos-ystem was successfully developed with sustained drug release and promising tumor-targeting potential, offering an advanced platform for precise breast cancer therapy.

Keywords: PAMAM dendrimers, Biomimetic nanosystem, Hyaluronic acid targeting, Breast cancer

Abstract Id: PCEU/PP/25

Development of targeted drug delivery systems to improve efficacy and reduce side effects

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Abstract

In Comparison with old medication, liposomes are show better possessions, with their site-of action, in release pattern, protection of degradation of drug in system environment like ocular enzyme and residence time, excellent targeted therapeutic effect, and reduce toxic effects. On behalf of these advantages, many of the liposomal formulation approved for use in daily life. Liposomes alter the distribution of drug in body increase the efficacy of drug and minimized side effects. Liposomes, structure and function, show a fundamental role in biomedical fields. Liposomes made up of vesicles the drug are entrapped in vesicles and form a bilayer the bilayer structures are called liposomes and the monolayer structures are called micelles. As drug carrier, liposomes show great activity, like prevent the drug degradation reduce side effect, increase half-life drug minimized the frequency of dosage, and control the release pattern of drug molecule s and great biocompatibility and safety. For the hydrophobic compound encapsulated in liposomes for the preparation of parenteral formulation have encountered restrictions in compressing certain supermolecules or high therapeutic doses of hydrophobic compounds, due to the limited capacity in the bilayer. The selectivity and arrangement of lipids show a vital part in overcome these challenges, influencing the overall efficacy of liposomes as drug delivery systems. Liposomes deliver many compensations for drug delivery. Their amphiphilic nature delivers compatibility with both hydrophilic and hydrophobic drugs.

Keywords: Targeted Drug Delivery, Nanoparticles, Liposomes, hydrophilic and hydrophobic

Abstract Id: PCEU/PP/26

A Comprehensive Review of a Bioadhesive Polymeric Gauze for Controlled Release of Salicylic Acid for Plantar Warts

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Abstract

Plantar warts are common, painful, & appear as small, rough growths over the feet caused by Human Papillomavirus. Conventionally they are treated using OTC, cryotherapy, laser therapy, surgery, which are often ineffective and time consuming. They are found in both males and females in approximately equal ratios, though some studies suggest a slightly higher incidence in females. This review focuses on a novel idea- a bio adhesive polymeric gauze that contain salicylic acid, natural bioactive compound, polymer for faster and more effective treatment. Salicylic acid acts as a keratolytic agent, helping to remove hardened skin layers while natural component provide antiviral and wound-healing benefits when used in combination, these agents exhibit synergistic action, and the drug release occurs in a controlled manner. The gauze is designed to completely cover the infected area of the foot, ensuring uniform and prolonged contact with the lesion. This enhances drug penetration, maintains localized drug conc., and increases the durability and therapeutic effectiveness of the treatment compared to conventional topical formulations. The dual action of salicylic acid and the natural product provide a safe, effective, and long-lasting formulation that promotes faster recover.

Keywords- Plantar warts, Salicylic acid, Gauze, Natural component, controlled release, Antiviral keratolytic therapy.

Abstract Id: PCEU/PP/27

DEVELOPMENT AND OPTIMIZATION OF TKI-LOADED POLYMERIC NANOPARTICLES FOR ENHANCED BREAST CANCER THERAPY

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Abstract
Breast cancer is the most common cancer diagnosed in women and the second most common cause of death from cancer among women across the globe. In recent years, tyrosine kinase inhibitors (TKIs) have emerged as promising agents for breast cancer treatment by blocking ATP-binding regions and inhibiting epidermal growth factor receptor (EGFR) kinase activity. However, they are often restricted by poor aqueous solubility and bioavailability. To overcome these limitations, this study developed TKI-loaded polymeric nanoparticles to enhance drug solubility and enable sustained, controlled release, thereby minimizing systemic toxicity and improving therapeutic efficacy. TKI-loaded polymeric nanoparticles were formulated using the solvent evaporation method. Optimization by Design Expert yielded an ideal formulation with improved entrapment efficiency, desirable particle size, and zeta potential, indicating its potential as an effective nanocarrier system for breast cancer therapy. The formulation was extensively characterized through particle size, polydispersity index (PDI), zeta potential, and TEM. The optimized formulation showed a particle size of 152 nm, PDI of 0.22, entrapment efficiency of 75%, and drug loading of 15%. Apart from this, the TEM study revealed that the particle size is spherical in shape, indicating uniformity and even distribution of particles. Additionally, in vitro drug release studies showed a sustained and controlled release profile with approximately 90% release of the drug during 12 days. In conclusion, the optimized TKI-loaded polymeric nanoparticles demonstrated favorable physicochemical properties, high drug encapsulation efficiency, and a sustained release profile, highlighting their potential as a promising nanocarrier system for improving the solubility, bioavailability, and therapeutic effectiveness of TKIs in breast cancer treatment.

Keywords- Tyrosine kinase inhibitors (TKIs), Breast cancer, Nanocarriers, Optimization, Characterization

Abstract Id: PCEU/PP/28

Polymers in Cosmetic Formulations: Functions and Innovative Developments

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Abstract
Polymers are indispensable components in modern cosmetic and personal care formulations, owing to their multifunctional properties that significantly enhance product texture, stability, and performance. They function as film formers, emulsifiers, thickeners, stabilizers, and conditioning agents, thereby improving the aesthetic appeal, sensory attributes, and shelf life of cosmetic products. Among these, silicone-based polymers are extensively employed for their ability to form smooth, flexible films, enhance spreadability, stabilize emulsions, and create a protective barrier over skin and hair surfaces. Alongside silicones, various natural, synthetic, and semisynthetic polymers act as additives, surfactants, dyes, rheology modifiers, and fragrance carriers, optimizing formulation efficacy and user experience. In recent years, sbiopolymers derived from renewable natural sources have attracted considerable attention due to their biocompatibility, biodegradability, and non-toxic characteristics. Their capacity to form emulsions, hydrogels, and films makes them ideal candidates for skincare, hair care, sun care, and anti-aging applications. Prominent examples such as alginate, hyaluronic acid, and chitosan are valued for their moisturizing, encapsulating, and barrier-forming abilities. Nevertheless, the widespread use of synthetic polymers has raised significant environmental and health concerns, including issues of toxicity, bioaccumulation, and persistence. Certain compounds

have been linked to skin irritation, organ toxicity, and potential carcinogenicity, driving the industry toward eco-friendly, biodegradable, and sustainable polymer alternatives. This paper underscores the functional versatility and innovation of polymers in cosmetics, providing a comparative overview of their types and applications, while emphasizing the growing role of biopolymers as safe, sustainable, and high-performance substitutes in next-generation cosmetic formulations.

Keywords: Polymers, Cosmetic Formulations, Biopolymers, Silicones, Film Formers, Skin care.

Abstract Id: PCEU/PP/29

Nasal Delivery of Insulin-Loaded Nanoparticles for the restoration of memory signaling in Alzheimer's disease

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Abstract
This study investigated the potential of innovative drug carriers to facilitate insulin delivery to the brain. Poly(lactic-co-glycolic acid) and poly(ethylene glycol)-modified PLGA nanoparticles were synthesized via a double emulsification technique. The synthesized PEG- PLGA copolymer was characterized using Fourier transform infrared spectroscopy, nuclear magnetic resonance, and mass spectrometry. In vitro release kinetics were evaluated in phosphate-buffered saline (PBS, pH 7.4). Results indicated that a Tween-80 based formulation provided a more sustained drug release profile compared to Tween-20 and poly(vinyl alcohol) based formulations. Chitosan coating of PEG-PLGA nanoparticles further prolonged and extended drug release. These findings, coupled with the expected mucoadhesive and targeting advantages conferred by chitosan, support the conclusion that this formulation is a promising candidate for targeted drug delivery to the brain.

Keywords: Insulin, nanoparticles, intranasal delivery, brain targeting, drug release, PLGA, mucoadhesion, Tween 80.

Abstract Id: PCEU/PP/30

An Overview : Nanoparticle- based imaging for cancer diagnosis

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Abstract
Cancer continues to be among the top causes of death globally, and early diagnosis is essential for successful treatment and higher patient life expectancy. Conventional imaging techniques, such as magnetic resonance imaging, computed tomography, positron emission tomography, and ultrasound, are effective diagnostic tools. However, they frequently lack the necessary capability, sensitivity, and specificity to identify early-stage tumors. In recent years, nanoparticle-based imaging has rapidly emerged as a revolutionary method for cancer diagnostics that offers improved contrast, targeted drug delivery, and multifunctional capacity. Such nanoparticles leverage tunable size, surface chemistry, and optical properties, allowing the possibility of engineering them to accumulate in tumor tissue selectively, whether using passive deposition mechanisms or active targeting. Various nanoparticles, including gold and quantum dots, iron oxide, and liposomes, have all been used for imaging techniques such as magnetic resonance imaging, computed tomography, fluorescence, and photoacoustic imaging. In addition to the imaging capabilities, the inclusion of therapeutic functionalities enables the techniques to be referred to as theranostics and is ideal for real-time cancer detection and monitoring. Rapidly improving translational processes can be attributed to technological advancement in nanoparticle surface modification, biocompatibility, and imaging capabilities. Some of the challenges necessitate

long-term toxicity reporting, in vivo clearance mechanisms, or clinical regulations. On the other hand, nanoparticles molecular imaging is a major step towards axial oncology, allowing for earlier and precise detection of cancer and other non-invasive methods of clinical diagnostics, generating improved treatment success and patient-centered personalization of the process.

Keywords: Nanoparticles; Cancer diagnosis; Molecular imaging; MRI; CT; Quantum dots; Gold nanoparticles; Theranostics; Targeted delivery; Precision oncology.

Abstract Id: PCEU/PP/31

From Digital Blueprints to Personal Pills: Al and 3D Printing Revolutionize Drug Delivery Systems

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The advancement of Ai and 3d printing technology played prime role in the world of medicine technology. Recent innovation in artificial intelligence and 3D printing technology have increased in a new era of personalized medicine, fundamentally altering how drugs are designed, manufactured, and delivered to patients. technology is endorsed by recent FDA regulatory changes removing animal testing requirements for clinical trials. this innovation can make medicine more affordable and accessible, reducing the 90% clinical trial failure rate, and calls for continued collaboration among government, academia, and industry to advance these solutions. combined approach of high resolution and low resolution 3d bioprinting convergence with Ai can overcomes current limitations. It also supports printing thick, vascularized, multi-cellular organ constructs that can potentially be transplanted. This strategy mimics natural organ complexity better and is crucial for advancing lab-grown organ transplantation technologies . 3D printed bilayer tablets were developed for tuberculosis treatment with release profiles controlled by the tablet structure rather than formulation changes. it also enables creating personalized disease models from patient biopsies to screen treatment options for individual patients, and regenerative medicine applications, such as for type 1 diabetes, hence By redefining how digital data becomes physical therapeutics, Al and digital printing of the "digital pharmacist" era paradigm where medicine is not prescribed but engineered for the individual. This innovation bridges the gap from molecule to medicine, paving the way for a faster, smarter, and more adaptive future in drug development and life saving therapy.

Keywords: Ai convergence with 3d printing, digital pharmacist era, Smart therapeutics, design algorithms, personalised treatment, transplantation technology

Abstract Id: PCEU/PP/32

Drug Delivery Through the Blood-Brain Barrier and Strategies to Enhance it's Passage

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Abstract

The blood-brain barrier (BBB) is a highly selective membrane that protects the central nervous system (CNS) from toxins and pathogens in the bloodstream, but also impedes most therapeutic agents from reaching the brain at effective concentrations. As a result, drug delivery for CNS disorders remains a major pharmacological challenge, necessitating innovative strategies to enable passage across the BBB while preserving its protective function. Recent advances highlight several promising approaches: nanoparticle- and polymer-based carriers, receptor-mediated transcytosis, focused ultrasound-mediated barrier opening, chemical modification of drugs, and direct administration via intranasal and intracerebroventricular routes. Each method aims to enhance permeability or target endogenous transport mechanisms, balancing safety and efficacy. Research in materials science, biotechnology, and device-assisted techniques continues to expand the possibilities for treating neurodegenerative and other CNS diseases. This poster

reviews the key structure and role of the BBB, major transport mechanisms, and current strategies to improve drug delivery, emphasizing advances in nanomedicine and clinically translatable technologies.

Keywords: Blood Brain Barrier, Strategies to Enhance Drug Delivery Across the BBB, Barriers to Drug Delivery, Biocompatibility, Nanomedicine

Abstract Id: PCEU/PP/33

Combinatorial Drug Delivery Via Targeting Cubosomal Gel Against Non-Melanoma

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Abstract

Non-melanoma skin cancer (NMSC) is among the most prevalent malignancies worldwide and is associated with significant morbidity, underscoring the need for advanced therapeutic strategies with enhanced chemotherapeutic efficacy. Conventional treatments often exhibit limited success due to issues such as poor drug selectivity and the development of drug resistance. To address these challenges, nanotherapeutic approaches, particularly targeted drug delivery systems capable of directing therapeutics to the desired area of tumor cells have gained substantial attention. In the present study, targeted dual drug-loaded cubosomal gel was developed, combining a chemotherapeutic agent with a phytoconstituent to achieve synergistic anticancer activity against non-melanoma skin cancer cells. The cubosomal formulation was optimized using a Box–Behnken design, yielding nanoparticles with an average size of 89 nm and a zeta potential of –14.08 mV. Following functionalization for targeting, the particle size increased to 158.7 nm and the zeta potential shifted to +10 mV, confirming successful coating. Characterization studies using UV–visible spectroscopy, DSC, and FT-IR validated the presence of both the drugs. In vitro cell line studies further demonstrated significant cytotoxic activity of the dual drug-loaded cubosomal gel, indicating its potential efficacy against NMSC.

Keywords: Skin Cancer, Combination Therapy, Mitochondrial Targeting, Cubosomes

Abstract Id: PCEU/PP/34

Formulation of Clarithromycin-Loaded Nanoparticles for the Treatment of Biofilm Infections

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Abstract

Biofilm-associated infections pose a major obstacle in the effective treatment of bacterial diseases. The dense extracellular matrix of biofilms restricts antibiotic penetration and protects microorganisms from host immune responses, resulting in persistent and drug-resistant infections. Clarithromycin, a macrolide antibiotic with broad-spectrum activity, shows limited success in treating such infections due to its poor solubility and reduced availability at the target site. The present research aims to develop a nanoparticle-based drug delivery system for clarithromycin to enhance its therapeutic potential against biofilm-forming bacteria. By encapsulating the drug within nanosized carriers, the formulation is expected to improve its solubility, stability, and controlled release profile, thereby enabling better diffusion through the biofilm matrix. The physicochemical characteristics of the system will be optimized to achieve efficient drug loading, sustained delivery, and improved site-specific accumulation. It is anticipated that this approach will enhance drug penetration, increase local concentration at the infection site, and prolong therapeutic activity. Such a delivery system may overcome the limitations of conventional formulations, offering a promising strategy for managing chronic and recurrent infections associated with biofilms.

Keywords: Clarithromycin, Nanoparticles, Biofilm infection, Controlled release, Targeted delivery

Abstract Id: PCEU/PP/35

Nano-Carriers Driven siRNA Delivery in Triple-Negative Breast Cancer: Advances, Challenges, and Future Prospects

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Abstract

Triple-negative breast cancer (TNBC) is an aggressive and highly metastatic subtype of breast cancer characterized by the absence of estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). Due to the lack of specific molecular targets, TNBC relies primarily on cytotoxic chemotherapy, which is often limited by rapid recurrence and the development of multidrug resistance (MDR). MDR arises from overexpression of efflux transporters (*ABCB1*, *ABCG2*), activation of oncogenic pathways (*PI3K/AKT*, *Notch1*), and anti-apoptotic proteins such as Survivin and *MCL1*. Small interfering RNA (siRNA) therapy offers a precise molecular approach to silence these resistance-associated genes at the post-transcriptional level. However, siRNA's therapeutic success is hindered by instability, poor cellular uptake, and endosomal degradation. Recent advancements in nanotechnology includes lipid nanoparticles, polymeric nanoparticles, inorganic (gold, mesoporous silica), aptamer-functionalized, and exosome-based systems have significantly improved siRNA protection, delivery, and tumour targeting. Preclinical studies demonstrate that nanocarrier-mediated siRNA delivery effectively suppresses oncogenes such as *PLK1*, *c-Myc*, *ABCB1*, and *XBP1*, restoring chemosensitivity to paclitaxel and doxorubicin while minimizing systemic toxicity. Moreover, hybrid and co-delivery systems combining siRNA with chemotherapeutics or immunomodulators exhibit synergistic antitumor activity and reduced metastasis. Together, these emerging nano-enabled siRNA platforms present a transformative strategy to overcome MDR in TNBC. Future research integrating personalized nanomedicine, AI-assisted carrier design, and hybrid co-delivery systems holds immense potential to achieve precise, effective, and safe gene-targeted therapy in TNBC.

Keywords: siRNA, TNBC, Drug Resistance, Nano-carriers.

Abstract Id: PCEU/PP/36

Liposomes: an innovative approach to sustained and improve the ocular drug delivery

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Abstract

Ophthalmic drug delivery presents significant challenges due to the unique anatomical and physiological barriers of the eye, such as tear turnover, blinking, and limited corneal permeability, which restrict drug absorption and bioavailability. Conventional dosage forms like eye drops often fail to maintain therapeutic drug concentrations for an adequate duration. Liposomes, as advanced vesicular carriers, have emerged as a promising strategy to overcome these limitations. Liposomes are microscopic phospholipid bilayer vesicles capable of encapsulating both hydrophilic and lipophilic drugs, thereby enhancing stability, bioavailability, and targeted drug delivery. In ophthalmic formulations, liposomes can adhere to the corneal surface, provide sustained drug release, and minimize systemic side effects. Formulation of liposomal eye preparations involves methods such as thin-film hydration, reverse-phase evaporation, and ethanol injection, with optimization of parameters like particle size, zeta potential, and encapsulation efficiency. These characteristics influence ocular retention time and therapeutic efficacy. Liposome-based formulations have been successfully investigated for drugs such as pilocarpine, timolol, and cyclosporine, demonstrating improved clinical outcomes in the treatment of glaucoma, inflammation, and dry eye syndrome. The

biocompatibility, non-toxicity, and ability to deliver drugs to both anterior and posterior ocular segments make liposomes an attractive platform for ophthalmic drug delivery. Overall, liposomal formulations offer a promising approach to enhance ocular bioavailability, reduce dosing frequency, and improve patient compliance in ophthalmic therapy.

Keywords- Liposomes, Ocular Drug Delivery, Controlled Release, Phospholipid Vesicles, Corneal Permeability, Sustained Release.

Abstract Id: PCEU/PP/37

Advancements in Novel Drug Delivery Systems: A Pathway Toward Targeted and Patient-Centric Therapeutics

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Abstract

The evolution of drug delivery technologies has revolutionized modern therapeutics, shifting the focus from conventional dosage forms to novel drug delivery systems (NDDS) that enhance therapeutic efficacy, safety, and patient compliance. NDDS aim to deliver drugs at a controlled rate, at specific sites, and in desired concentrations, thereby minimizing adverse effects and optimizing bioavailability. Various innovative approaches such as nanoparticles, liposomes, microspheres, transdermal patches, dendrimers, and polymeric systems have been developed to overcome limitations associated with traditional drug delivery. These systems offer targeted and sustained drug release, improved pharmacokinetic profiles, and enhanced therapeutic outcomes, particularly in chronic and life-threatening conditions. Furthermore, recent advancements in nanotechnology, biopolymers, and stimuli-responsive carriers have opened new frontiers for precision medicine. Here, the highlights of current trends, key technologies, and future perspectives of NDDS in achieving effective and patient-centered drug therapy.

Keywords: Novel drug delivery systems, targeted drug delivery, nanotechnology, controlled release, liposomes, transdermal systems, polymeric carriers, sustained release, therapeutic efficacy.

Abstract Id: PCEU/PP/38

Transdermal Drug Delivery System: Innovative Pharmaceutical Development

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Abstract

A cutting edge, non-invasive method for delivering therapeutic agents through the skin and straight into the bloodstream is the Transdermal Drug Delivery Systems(TDDS). Compared to traditional routes, it has many benefits, including avoiding hepatic first-pass metabolism , reducing gastrointestinal irritation, and allowing for controlled, prolonged drug release. The epidermis, dermis, and subcutaneous tissue make up the skin's multilayered structure, which serves as a barrier and a portal for drug absorption. Transcellular, intercellular, and appendageal pathways are the main ways that drugs enter the body. A backing layer, drug reservoir or matrix, rate-controlling membrane, adhesive layer, and release liner make up a standard TDDS patch. To maximize performance, several patch types have been developed , such as matrix , reservoir, adhesive dispersion, and micro needle-assisted designs. Drug permeation is further improved by contemporary developments like iontophoresis, sonophoresis, electroporation, and nanocarrier based systems, which makes TDS appropriate for a variety of therapeutic uses. Transdermal administration of nitro-glycerine, nicotine, fentanyl, estradiol, and scopolamine are typical examples. The potential of TDDS for peptide, protein, and vaccine delivery is growing despite drawbacks like skin irritation and limited drug permeability due to

continuous advancements in nanotechnology and smart wearable technology. To sum up , TDDS is a promising, patient friendly, and cutting edge platform for long -term, safe, and efficient medication therapy.

Keywords: Transdermal Drug Delivery System , Controlled Release, Microneedles, Iontophoresis, Bioavailability, Nanocarriers, Smart Patches, Novel Drug Delivery.

Abstract Id: PCEU/PP/39

Polymer Based Nanoparticles Strategies for Insulin Drug Delivery

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Abstract:
Diabetes mellitus is a common metabolic disorder marked by chronic hyperglycemia due to impaired insulin secretion or action. Affecting hundreds of millions worldwide, it is classified as type 1 (T1D) or type 2 (T2D). Insulin therapy remains the primary treatment, but frequent
injections and invasiveness often reduce patient adherence and treatment efficiency. To overcome these limitations, research has focused on advanced drug delivery systems (DDSs), particularly nanotechnology-based approaches. Nanoparticles (NPs), with sizes typically between 1–100 nm, offer precise control, enhanced bioavailability, and targeted insulin delivery. They enable sustained and controlled drug release while reducing dosing frequency. Polymer-based nanoformulations, generally 100–1000 nm in size, combine biocompatible polymers with insulin to improve therapeutic stability and circulation time. Their performance depends on factors such as particle size, molecular weight, and surface charge, which influence their ability to cross biological barriers and reach target tissues. Optimizing these parameters allows prolonged insulin release, better bioavailability, and improved compatibility, making polymeric nanoparticles a promising platform for effective diabetes management.

Keywords: diabetes, insulin, therapeutic, nanoparticles, drug delivery systems, nanotechnology, polymer, bioavailability.

Abstract Id: PCEU/PP/40

Novel Drug Delivery Approaches Using 3D-Printed Pharmaceuticals: A Revolution in Personalized Medicine

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Abstract
The advent of three-dimensional (3D) printing technology in pharmaceuticals represents a groundbreaking advancement in novel drug delivery systems. This emerging approach enables precise control over drug formulation, dosage customization, and release kinetics, paving the way for truly personalized medicine. 3D-printed drug delivery systems utilize advanced materials such as biodegradable polymers, hydrogels, and nanocomposites to design oral tablets, transdermal patches, and implantable devices with high spatial accuracy and reproducibility. The flexibility of this technique allows the integration of multiple active pharmaceutical ingredients (APIs) into a single dosage form, facilitating combination therapies and improving patient compliance. Despite its promising potential, challenges remain in terms of regulatory approval, scalability, and long-term stability of printed formulations. This review discusses the principles, materials, and techniques used in 3D pharmaceutical printing, highlighting its pharmacokinetic benefits and therapeutic applications in oncology, pediatrics, and chronic disease management. Furthermore, the paper explores current limitations and future perspectives in developing safe, efficient, and patient-tailored drug delivery systems through 3D printing technologies.

Keywords: 3D printing, Novel drug delivery, Personalized medicine, Additive manufacturing, Controlled release, pharmaceutical technology

Abstract Id: PCEU/PP/41

Synthesis, characterization and formulation, lactoferrin-coated, HA-capped CS NPs loaded with nanoparticles containing drug

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Abstract

In this study a anticancer drug with low toxicity, lactoferrin-coated into Hyaluronic acid (HA) capped with drug nanoparticles. Hyaluronic acid (HA), a natural polysaccharide known for its
biocompatibility, biodegradability, and non-toxicity, serves as an efficient drug carrier The obtained HA cores were then coated with Chitosan and lactoferrin to enhance their anticancer and cellular uptake properties. The physiochemical properties of nanoparticles such as average particle size (Z), polydispersity index (PDI), zeta potential (ZP), TEM image and encapsulation efficiency were determined. Both LF and CS improved the cytotoxicity of nanoparticles compared to free drug and HA nanoparticles in HepG2 liver cancer cell lines.

Keywords: chitosan; nanoparticles; liver-targeted; apoptosis; HepG2

Abstract Id: PCEU/PP/42

NANOMICELLAR LOADED FENOFIBRATE FORMULATION FOR DIABETIC RETINOPATHY

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ABSTRACT

Diabetic retinopathy (DR) marked as a key microvascular difficulty from diabetes and a reason of blindness that can't be ignored. In present scenario its treatments involve invasive techniques and they suit in later stages of the disease better. This designate for a therapy that starts early and eases patient significance. Fenofibrate functions as a PPAR-α agonist and tends to have dyslipidaemia as its main function. Studies in clinics discloses that it shields the eyes by slowing Diabetic retinopathy in advance. It operates by cutting oxidative stress, vessel swelling, and fat stored-up in the retina. Until now, its role in eye care faces limits. Deficient water solubility and weak reach to the retina cause this. This study focused on creating Nano-micelles loaded with Fenofibrate for ophthalmic delivery which can the increase solubility, extend drug release, and boost drug delivery to the retina. Method used for its preparation is solvent evaporation technique and evaluating the nanomicelles for its particle size, shape, drug entrapment and release. The Nano-micellar system manifests a narrow size range at the nanoscale. It also had well- built drug trapping ability and slow release over time. These characteristics suggest it works well for eye drug delivery. The novel formula provides a hopeful treatment preference. This approach ignores invasive steps for early diabetic retinopathy care.

Keywords: Fenofibrates, Nano-micelles, Ophthalmic delivery, Diabetic retinopathy, Drug targeting

Abstract Id: PCEU/PP/43

Artificial Intelligence in Personalized and Targeted Drug Delivery: A New Era of Smart Therapeutics

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Abstract:
Personalized and targeted therapies are changing as a result of the convergence of modern drug delivery technology and artificial intelligence. AI-driven techniques, such as machine learning, deep learning, and forecasting, make it possible to precisely analyse intricate medical, pharmacological, and clinical databases in order to create customized treatment plans. AI helps discover patient-specific characteristics like genetic polymorphisms, metabolic profiles, and illness progression trends in personalized medicine delivery, making it easier to create customized formulations. In the meantime, AI enhances site-specific drug release, reduces off-target effects, and boosts bioavailability in targeted delivery by optimizing carrier design, including liposomes, nanoparticles, and polymeric systems. Drug release kinetics may be tracked and dosage can be dynamically adjusted based on patient response by combining AI with in computational modelling and continuous biosensing technology. This clever system shortens the time it takes to develop new drugs, speeds up formulation optimization, and lowers experimental failure rates. Additionally, AI predictive powers help anticipate any adverse effects and enhance treatment results in general. AI role in tailored and targeted drug administration is a crucial step toward smart medicines, despite obstacles in integrating data, validation, and regulatory acceptability. By making therapies more effective, flexible, and precisely tailored to each patient needs, this creative synergy has the potential to completely transform the healthcare industry.

Keywords: Precision Medicine, Targeted Therapy, Artificial Intelligence, Optimized Formulation

Abstract Id: PCEU/PP/44

To synthesize silver nanoparticles using Cyperus rotundus and formulate a nanoparticle-loaded hydrogel for antimicrobial and wound-healing applications

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Abstract
Wound healing is a complex biological process that can be hindered by persistent infections and inflammation, especially in the presence of multidrug-resistant (MDR) bacteria. Silver nanoparticles (AgNPs) have demonstrated significant antimicrobial efficacy; however, concerns regarding their toxicity have limited their therapeutic application.
Methods: In this study, we developed a biocompatible Ag-NPs-based hydrogel using Cyperus rotundus extract via a green synthesis approach for prospective wound healing applications. The synthesized AgNPs were characterized for their physicochemical properties, confirming their stability and antibacterial potency against E. coli and S. epidermidis. The Ag-NPs-loaded hydrogel was formulated using Carbopol 974P and evaluated for its physicochemical properties, antibacterial activity, anti-inflammatory potential, and cytotoxicity.
Results: Characterization studies confirmed the successful synthesis of AgNPs, exhibiting potent antibacterial, antioxidant, and anti-inflammatory properties. The Ag-NPs-loaded hydrogel demonstrated significant wound contraction in an excision wound model, comparable to standard treatment.
Conclusions: These findings suggest that the developed Ag-NPs-based hydrogel is an effective, natural, and safer alternative for advanced wound care, warranting further clinical validation.

Abstract Id: PCEU/PP/45

Nanotheranostics Targeted drug delivery system used in wound healing

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Abstract:

The complicated process of wound healing is frequently affected by long-term illnesses including inflammation, infection, and oxidative stress. Poor penetration and quick bioactive agent degradation are problems for conventional treatments. Transethosomes and other nanotheranostics provide a cutting-edge method for improving cutaneous medication delivery. The in vitro application of genistein, a naturally occurring isoflavone with anti- inflammatory and antioxidant qualities, in wound healing is being investigated. This work focuses on the in vitro assessment of genistein-loaded transethosomes made using the straightforward cold approach for effective wound healing. The improved genistein transethosomes formulation showed a zeta potential of –32.12±3.2 mV, indicating good colloidal stability, a vesicle size of 100 nm, and a PDI of 0.30, indicating uniformity. A satisfactory drug potential of 44.15±2.5% was reflected in the entrapment efficiency of 80.8±1.5%. The potential of transethosomes to sustain continuous drug availability was confirmed by in-vitro release tests, which demonstrated a sustained release of 90.24±1.5% in 24 hours. These findings promote more in-vivo research for wound healing applications by demonstrating the potential of transethosomes as a nanotherapeutic platform for effective cutaneous administration of genistein.

Keywords: Nanotheranostics, genistein, transethosomes, wound healing, dermal drug delivery, sustained release

Abstract Id: PCEU/PP/46

Synergistic Combination Nanoformulations for Managing Alzheimer's Disease

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Abstract:
Background: Amyloid-β plaques and tau neurofibrillary tangles accumulate in Alzheimer disease (AD), which makes up 60–80% of dementia cases in those over 65. These tangles cause progressive cognitive impairment. The risk of AD is increased by a number of conditions, including diabetes, high blood pressure, and cardiovascular problems. Because of their anti-inflammatory, neuroprotective, and antioxidant qualities, herbal substances have become attractive options.
Aim/Objectives: By assessing their physicochemical characteristics and feasibility for upcoming formulations, this study investigates the medicinal value of synthetic and natural medications in AD.
Method: Extensive analyses that ensured interactions, stability, and formulation adequacy included UV, FTIR, DSC, melting point, partition coefficient, solubility, and UV-based drug excipient compatibility. Result: Preliminary results show the potential of the nano formulation in AD treatment, and the molecule demonstrated excellent lipophilicity for BBB penetration. Ex-vivo and in vivo research is being conducted to prove safety and efficacy, while UV-based drug–excipient compatibility verified interactions and stability. Conclusion: The findings strengthen herbal-based therapies by demonstrating the substance & potential for neurological treatment, with anti-inflammatory and antioxidant actions that may lessen the effects of AD.
Keywords: Alzheimer's disease, antioxidant, neuroprotection, blood brain barrier.

Abstract Id: PCEU/PP/47

Engineering of bile acid derived biomaterials for cancer therapy and their mechanistic studies

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Abstract:
Cancer continues to be a significant global health issue due to its complex biology and the unchecked proliferation of genetically modified cells. Biomaterials derived from bile acids present a promising therapeutic option because of

their amphiphilic characteristics, biocompatibility, and strong affinity for cellular membranes. This research explores two amphiphiles based on bile acids, LCA-PYRROL and LCA-PIP, which showed significant anticancer efficacy along with favorable safety profiles. Their inclusion in hydrogel formulations (PYRROL-Gel and PIP-Gel) further improved therapeutic effectiveness by hindering tumor development, enhancing survival rates, and reducing systemic toxicity. Moreover, a hydrogel-based chemoimmunotherapy method that combines imiquimod (IMQ) with these anticancer agents resulted in synergistic effects, decreasing tumor size, preventing recurrence, and promoting systemic immune activation. This approach holds promise for managing both localized and metastatic cancers. Mechanistic investigations indicated that bile acid–derived biomaterials function through various pathways, including enhanced cellular uptake via membrane insertion and mitochondrial destabilization, ultimately leading to cancer cell death. In summary, the results emphasize engineered bile acid-based biomaterials and their hydrogel formulations as versatile and efficient options for advanced cancer treatment.

Keywords: Cancer, bile-acid derivative, hydrogel, amphiphiles, cancer therapy, LCA- PYROLL and LCA-PIP, anticancer activity, tumor burden reduction.

Abstract Id: PCEU/PP/48

AI- Integrated Microneedle Patch for Smart and Targeted Cancer Therapy

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Abstract

Conventional cancer treatments often cause severe side effects due to systemic drug exposure. The AI integrated microneedle patch represents an advanced, painless, and targeted approach for localized drug delivery. Embedded sensors continuously monitor parameters like temperature, pH, and biomarkers at the tumor site. Using artificial intelligence, the system analyzes this data and automatically adjusts the drug release rate, ensuring precise and personalized therapy. This smart, feedback-controlled microneedle platform minimizes toxicity, enhances patient comfort, and provides real-time monitoring. Although still under research, it offers a futuristic vision for intelligent, patient-centered cancer treatment.

Keywords: Microneedle patch, Artificial Intelligence, Cancer therapy, Smart drug delivery, Personalized medicine.

Abstract Id: PCEU/PP/49

Formulation Development and In-vitro Characterization of Neem Extract Loaded Transferosomes for Potential and Topical Delivery in Breast Cancer

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Abstract

Background: Neem (Azadirachta indica) has shown promising anticancer and cytotoxic activity, but its topical use is limited due to poor solubility, instability and low skin permeability. Transferosomes provide the flexible lipid vesicle system that can improve penetration and improve topical delivery.
Aim: The aim of this study was the formulation, development, and in vitro characterization of Neem extract loaded transferosomes for potential topical delivery in breast cancer.
Methodology: Transferosomes were prepared using the ethanol injection method, followed by sonication for size reduction. Phospholipid and Tween 80 were used as main components to form flexible vesicles. A Box–Behnken Design was applied to optimize phospholipid amount, Tween 80 concentration, and sonication time. The optimized

batch was evaluated for vesicle size, PDI, entrapment efficiency, DSC, FTIR, and in-vitro drug release. **Results and Conclusion:** The optimized formulation showed a vesicle size of about 116 nm, a PDI of 0.229, and an entrapment efficiency of around 97%. DSC showed a broad endothermic peak at 347.83°C, indicating reduced crystallinity and proper incorporation of Neem. FTIR confirmed compatibility through characteristic C–H, C=C, and C=O related peaks. In-vitro release showed an initial fast release followed by a controlled phase, with Korsmeyer–Peppas being the best-fit model. Overall, Neem-loaded transferosomes demonstrated improved stability, penetration, and sustained release, showing potential for topical breast cancer therapy.

Keywords: Neem extract, Transferosomes, Topical delivery, Breast cancer, BBD optimization.

Abstract Id: PCEU/PP/50

Revolutionising Therapy: Phytosome Technology to Overcome Bioavailability Barriers in Breast Cancer

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Abstract:

Breast cancer remains a leading cause of global cancer mortality, with treatment efficacy often compromised by significant pharmacological hurdles. The poor bioavailability of many potent chemotherapeutic agents, particularly natural-derived compounds, is a critical barrier, acting as a growing bottleneck in successful therapy. This limitation is primarily driven by factors such as low aqueous solubility, extensive first-pass metabolism, and poor absorption, which ultimately limit the drug concentration at the tumour site. The dependencies of treatment failure vary based on the drug's chemical nature, tumor microenvironment, and limitations of conventional delivery systems. Major investigational pathways are focused on enhancing drug solubility, stability, and targeted cellular uptake. Moreover, advanced formulation strategies are employed to characterize and overcome these pharmacokinetic challenges. Conventional oral and intravenous formulations often exacerbate toxicity without achieving therapeutic thresholds. Moreover, modern nanotechnological approaches, including liposomes, nanoparticles, micelles, and phytosomes, are being explored. Specifically, phytosome technology is emerging as a revolutionary strategy and by forming a complex between the drug molecule and phospholipids, phytosomes dramatically enhance lipid solubility and membrane permeability, effectively overcoming bioavailability barriers. Global scientific platforms such as the FDA and EMA are actively evaluating these advanced delivery systems for clinical application. This formulation technology revolutionised and holds the potential to unlock the full therapeutic efficacy of existing and novel drugs, significantly improving survival and quality of life for breast cancer patients.

Keywords: Phytosomes, Breast cancer, Bioavailability, Phosphatidylcholine, Phytochemicals

Abstract Id: PCEU/PP/51

DEVELOPMENT OF A CURCUMIN–SILVER NANOFORMULATION FOR MANAGEMENT OF IRRITANT CONTACT DERMATITIS

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Abstract

Irritant Contact Dermatitis (ICD) is a non-specific inflammatory skin condition that arises from the toxic effects of chemicals on epidermal cells, leading to inflammation through activation of the innate immune system. It develops after repeated exposure to mild irritants and appears at the site where non-protein chemical substances come into contact with the skin, producing a local toxic response. **This study examines the key preformulation factors for managing ICD by analyzing the physicochemical profile of curcumin and formulating a curcumin–silver nanoparticle–based nanoformulation.** Curcumin offers strong anti-inflammatory effects, while silver nanoparticles

provide antimicrobial and healing actions. When combined as Cur-SNP (curcumin-silver nanoparticle), it improves curcumin's stability and skin penetration, creating a synergistic treatment that manages ICD more effectively than using drug alone. The structural integrity, safety and purity of the formulation were verified by analytical methods such as UV, FTIR, and DSC. FTIR results verified that curcumin maintained its chemical integrity within the silver nanoparticle system, indicating no incompatibility with formulation components. The formulation showed a particle size of 156.68 nm with a PDI of 0.3214, suggesting acceptable distribution, while the zeta potential of –29.71 mV confirmed adequate stability. The preliminary results indicate that the Cur-SNP is a promising topical delivery system for irritant contact dermatitis.

Keywords: Curcumin, Silver Nanoparticles, Irritant Contact Dermatitis

Abstract Id: PCEU/PP/52

Biodegradable Nanocarriers for Controlled and Site-Specific Cancer Treatment

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Abstract

According to the World Health Organization, cancer is the second leading cause of death worldwide after ischemic heart disease. Cancer is responsible for about 10 million deaths-one in six deaths globally as recorded in 2020. Even though most forms of cancers are curable when diagnosed early and treated accordingly, traditional chemotherapy has severe limitations, including systemic toxicity, multidrug resistance, poor selectivity, and damage to normal tissues. These challenges have, therefore, intensified the search for more effective and targeted therapeutic interventions. Biodegradable nanocarriers have thus been developed as a promising innovation in cancer treatment. At the nanoscale, these delivery systems enhance the precision, safety, and therapeutic action of anticancer agents. With site-specific drug delivery, they minimize toxicity and resistance while maximizing the pharmacological action at the tumor site. Their biodegradable nature guarantees their degradation into nontoxic byproducts inside the body, offering additional advantages in terms of biocompatibility. At the same time, nanocarrier-based therapies have their own set of challenges. It remains a difficult task to design nanoparticles with optimal size, shape, and surface chemistry, with appropriate inner and outer layers in relation to specific cancers. Overcoming these challenges requires sophisticated approaches, such as the development of massively parallel pooled screening methods or other innovative research tools. Thus, such approaches may be able to ultimately tune nanocarriers for maximum therapeutic performance in future oncological applications.

Keywords: Biodegradable, nanocarriers, site-specific drug delivery ,massively parallel pooled screening, chemotherapy, pharmacological action.

Abstract Id: PCEU/PP/53

The Emerging Role of Niosomal Gels in Topical Drug Delivery Systems

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Topical drug delivery has always been a patient-friendly approach to treating localized disorders, skin wounds, and infections. However, more traditional topical formulations such as creams, ointments, and gels often face shortcomings of limited penetration through the stratum corneum, short retention or residence time, and lack of an ideal release profile. Recently, niosomal gels have emerged as a potentially new platform of niosomes, vesicular

carriers based on non-ionic surfactants, that merge the benefits of niosomes with the properties of hydrogels and hydrogel matrices. Niosomes, essentially cholesterol and non-ionic surfactants, can incorporate hydrophilic and lipophilic drugs, leading to improved solubility, stability, and controlled release. The vesicles will improve adhesion to the skin in gel form, improve sustained release of the drug, which will enhance penetration, and lead to enhanced therapeutic outcomes, which have been noted in limitations of traditional gel topical formulations. Compared to gels or topical formulations tested, niosomal gels provide greater bioavailability, require less frequent dosing, and are positively associated with compliance. Significant research has demonstrated success in incorporating niosomal gels with antifungal drugs, anti-inflammatory drugs, antibacterial agents, and cosmetic actives in the pharmacy parameter for dermal delivery. Recent studies show that niosomal gels achieve improved outcomes with an extremely low incidence of systemic side effects, which confirms the niosomal convention as a standard for pharmaceutical or cosmeceutical applications.

Keywords: niosomes, vesicular carriers, vesicular carriers, gel

Abstract Id: PCEU/PP/54

Clotrimazole loaded chitosan nanoparticles incorporate in Mucoadhesive gel for oral candidiasis

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Abstract

Oral candidiasis is a common fungal infection caused predominantly by *Candida albicans*, often requiring prolonged antifungal therapy. The present study aims to develop and evaluate **clotrimazole-loaded chitosan nanoparticles incorporated into a mucoadhesive gel** for effective localized treatment of oral candidiasis. Chitosan nanoparticles were prepared using the ionic gelation method with sodium tripolyphosphate (TPP) as a crosslinking agent. The formulated nanoparticles were characterized for particle size, zeta potential, polydispersity index (PDI), drug entrapment efficiency, and in vitro drug release. The optimized nanoparticles were then incorporated into a carbopol-based mucoadhesive gel to enhance retention time and drug penetration across the oral mucosa. The developed formulation exhibited a mean particle size below 200 nm with a positive surface charge, indicating good stability and mucoadhesive potential. In vitro release studies demonstrated sustained drug release over 24 hours, while ex vivo mucoadhesion tests confirmed strong adherence to oral mucosa. Antifungal activity against *Candida albicans* showed significantly improved efficacy compared to conventional clotrimazole gel. Overall, the **clotrimazole-loaded chitosan nanoparticle mucoadhesive gel** offers a promising approach for site-specific, sustained antifungal delivery in the management of oral candidiasis with reduced dosing frequency and improved patient compliance.

Keywords: Clotrimazole, Chitosan nanoparticles, Mucoadhesive gel, Oral candidiasis, Sustained release, Antifungal delivery.

Pharmaceutics
Oral Presentation

Abstract Id: PCEU/OP/01

Polymeric micelles for the targeted delivery of poorly soluble drugs for cancer treatment

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Abstract
Nanomicelles are self-assembling nano-sized (typically ranging from 10 to 100 nm) colloidal dispersions consisting of a hydrophobic core and a hydrophilic shell. Within the array of therapeutic conveyance approaches, PMs have garnered immense attention in the realm of nanomedicine, attributable to their cost-effective nature, remarkable biocompatibility, simple fabrication methodologies, and efficacious performance. Furthermore, nano micellar system demonstrates superior thermodynamic steadiness in physiological fluids compared to conventional micellar counterparts, which is signified by a reduced critical micelle concentration (CMC), imperative for maintaining stability and impeding expeditious disintegration within the *in-vivo* microenvironmental milieu.
Additionally, nano micellar drugs have been observed to combat drug resistance by enhancing drug accessibility and sensitivity through the accumulation of high local drug concentrations at tumor sites via the enhanced permeation and retention (EPR) effect. Among various nanotechnology-based drug delivery systems like liposomes, nanotubes, and nanomicelles, the latter holds advantages for cancer therapy, such as its high drug loading capacity for effective therapeutic efficacy and small size enabling deep penetration into tumour tissues.

Keywords: Active targeting, Passive targeting, CMC, EPR effect

Abstract Id: PCEU/OP/02

Red Blood Cell-Derived Nanoerythrosomes: Innovative Carriers for Drug Delivery Systems

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Abstract
Getting drugs to the brain has always been a challenge, in large part because of the blood-brain barrier, which keeps most molecules capable of actually helping to treat serious conditions out. Conventional delivery systems tend to be nonspecific, lack sustained circulation, and risk side effects; therefore, researchers continue to search for alternatives. Nanoerythrosomes, which are nanosized vesicles derived from erythrocyte ghosts, are emerging as a fascinating alternative option. They feature the natural advantages of red cells, great compatibility with the body, a long circulation time, and an inbuilt capacity to slip past immune defences. These vesicles are capable of entrapping water-soluble and fat-soluble drugs, and on surface modification with ligands or peptides, exhibit better ability to traverse the BBB via receptor-mediated mechanism. Recent work has shown some promising signals in conditions

such as glioblastoma, Alzheimer's, and Parkinson's, where these carriers helped drugs act more effectively, lowered unwanted side effects, and, in some cases, hinted at better patient outcomes. Compared with lab-made systems like liposomes or niosomes, nanoerythrosomes usually last longer in circulation and spread more evenly in the body, which makes them stand out as a stronger option. This review synthesises current knowledge and highlights nanoerythrosomes as a promising approach in targeted treatment for brain disorders, with the potential to play a significant role in the shift toward precision medicine.

Keywords: Nanoerythrosomes, Blood-Brain Barrier, Targeted Drug Delivery, Neurological Disorders, Biogenic Nanocarriers

Abstract Id: PCEU/OP/03

Phytochemical-Driven Nanoparticle Synthesis from Nyctanthes arbortristis: A Green Route to Multifunctional Bioactive Nanomaterials

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Abstract
Green nanotechnology offers an eco-friendly and sustainable approach to the synthesis of functional nanomaterials. Nyctanthes arbor-tristis (Harsingar), a medicinally valuable plant rich in bioactive phytochemicals such as flavonoids, terpenoids, and phenolic compounds, has emerged as an efficient reducing and stabilizing agent in the green synthesis of metallic and metal oxide nanoparticles. This eco-friendly approach eliminates the need for toxic reagents while enhancing nanoparticle stability, biocompatibility, and functionality. Recent studies reveal that Harsingar-derived metallic nanoparticles exhibit remarkable biological properties including antibacterial, antioxidant, anticancer, anti-inflammatory, and larvicidal activities. The synergistic role of phytochemicals not only influences particle morphology and size but also contributes to enhanced therapeutic potential. The focus of the current work is to review the research studies exploring Nyctanthes arbor-tristis-based metallic nanoparticles for biomedical applications. This work highlights their potential as multifunctional bioactive nanomaterials and their future prospects in nanomedicine and environmental applications.
Keywords: Nyctanthes arbor-tristis, Harsingar, Green synthesis, Metallic nanoparticles, Antibacterial, Anticancer, Nanomedicine.

Abstract Id: PCEU/OP/04

Smart Polymeric Biomaterials: Transformative Advances in Wound Healing and Precision Drug Delivery Systems

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Abstract
Recent advances in polymer science are redefining the landscape of wound management and targeted drug delivery through the development of intelligent, multifunctional biomaterials. Smart polymeric systems engineered from both natural and synthetic sources are now being designed as hydrogels, nanofibers, films, and scaffolds capable of delivering therapeutic agents in a controlled, sustained, and site-specific manner. These materials respond dynamically to physiological cues such as pH, temperature, and enzymatic activity, enabling real-time adaptation to wound microenvironments or disease sites. Hybrid polymer composites incorporating nanoparticles, growth factors, or bioactive peptides further enhance angiogenesis, infection control, and tissue regeneration. Notably, polymers such as

PLGA, chitosan, and PEGylated carriers are being explored for patient-specific and integrative therapies, bridging modern nanotechnology with insights from traditional medicine. Emerging tools like 3D/4D printing and bioinformatics-driven material design are propelling the next generation of customizable, responsive biomaterials. Despite these breakthroughs, translational challenges persist, including concerns of biocompatibility, mechanical robustness, scalability, and regulatory compliance. Addressing these barriers through interdisciplinary innovation will be essential to realize sustainable, safe, and patient-centered solutions for chronic wounds, complex skin injuries, and precision therapeutics.

Keywords: Polymers, Drug delivery, Wound care, Skin regeneration, Hydrogels, nanotechnology, Biomaterials.

Abstract Id: PCEU/OP/05

Advancing Cancer Therapy Through DNA Aptamer-Tethered Co-Delivery Nanoplatforms

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Abstract

According to National Center of Health Statistics (2021), United States reported 18, 98,160 new cancer cases and 6, 08,570 cancer death. It clearly symbolizes that cancer is the leading cause of death in today's time. The convention methods of treating cancer involve chemotherapy, surgery, radiotherapy, gene therapy and immunotherapy. Out of this 50-60% cancer patient receives chemotherapy and among this chemotherapy treated cancer patients 50-90% patients develop Multiple Drug Resistance (MDR). It can result in decreased treatment efficacy, limited treatment options, compromised immune system, higher treatment cost, increased risk of recurrence and all these things leads to the development of fatal health condition of our patient. In order to prevent this condition, the nanotechnology based novel targeting drug delivery system which provide a new idea for co-delivery of multidrug and combination therapy is used. It was found that for this purpose DNA aptamer-tethered nanostructure were used to deliver both chemotherapeutic agents and phototherapeutic agents for treating cancer. These nanostructures show high specificity and stability. In present scenario, the studies on following DNA nanostructure-based chemotherapy phototherapy are going on:

- Idarubicin or mithramycin was combined with acridine orange
- Doxorubicin and toluidine blue
- Daunorubicin and acridine orange to DNA Tetrahedron

Keywords: Cancer, DNA aptamer-tethered, Nanostructure, Chemotherapy, Phototherapy.

Abstract Id: PCEU/OP/06

Exploring Solid Dispersion Technology as a Dual Strategy For Solubility and permeability Challenges in BCS Class II and IV Drugs

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Abstract

Poor aqueous solubility remains a major challenge in the development of oral dosage forms, particularly for drugs belonging to Biopharmaceutics Classification System (BCS) Class II and Class IV. Class II drugs possess low solubility but high permeability, while Class IV drugs exhibit both poor solubility and low permeability, making their formulation especially difficult. Solid dispersion is one of the most promising approaches to enhance solubility and

dissolution rate of such drugs. This technique involves dispersing the drug in an inert carrier matrix in solid state, leading to improved wettability, reduced particle size, and conversion to an amorphous form. Various methods such as solvent evaporation, fusion, and spray drying are widely used for preparing solid dispersions. While solid dispersion can effectively improve dissolution for Class II drugs, its application in Class IV drugs often requires additional strategies like permeability enhancers or surfactants. Overall, solid dispersion technology provides a valuable platform for overcoming solubility-related challenges and enhancing the bioavailability of poorly soluble drugs, though optimization of formulation parameters remains crucial for achieving stable and scalable outcomes.

Keywords: Wettability, Solubility , Dissolution Rate, Spray Drying

Abstract Id: PCEU/OP/07

Advances in nano formulated topical therapies for chronic and recurrent urticaria: from preclinical evidence to clinical translation

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Abstract

Developments in nano formulated topical treatments have created encouraging possibilities for addressing chronic and recurrent urticaria, a long-lasting skin issue marked by itchy, red hives that impact around 1% of the worldwide population, particularly more common in women and younger individuals. This abstract examines the advancement from preclinical research to clinical application in creating nanoscale drug delivery systems designed to improve therapeutic results for patients with urticaria. Nano formulation utilizes minuscule particles that greatly enhance the absorption and bioavailability of topical agents within skin layers, thus boosting their anti-inflammatory and anti-itch properties. Recent research highlights the promise of nanocarriers derived from herbal and natural products as safer, more effective options with minimized systemic side effects. Experimental data from nanogels and nano emulsions shows enhanced skin penetration and prolonged drug release, rendering these formulations especially efficient in preclinical models of urticaria. The clinical application of these innovative nano-topical treatments is gaining traction, bolstered by continuous trials investigating safety and effectiveness. Regulatory systems are adapting to incorporate these innovations, emphasizing the necessity of comprehensive assessment of long-term impacts. Research on nanostructured lipid carriers and other innovative delivery systems highlights their adaptability in dermatology, particularly in treating chronic urticaria.

Keywords: Nano formulations, localized drug administration, chronic hives, nanogels, nano emulsions, herbal nanocarriers, clinical application, dermatology, anti-inflammatory treatment.

Abstract Id: PCEU/OP/08

TASTE-MASKING INNOVATIONS IN PEDIATRIC DRUG DELIVERY: A PATH TOWARD IMPROVED THERAPEUTIC OUTCOMES

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Abstract

The development of pediatric dosage forms presents unique challenges, particularly in ensuring palatability, safety, and acceptability among children. One of the primary barriers to pediatric medication adherence is the unpleasant taste of active pharmaceutical ingredients (APIs). Effective taste-masking technologies play a crucial role in improving

compliance, therapeutic outcomes, and patient experience. The study provides an in-depth review of modern strategies and formulation approaches used in pediatric dosage forms to overcome taste challenges. Key technologies including coating techniques, ion-exchange resins, inclusion complexes, microencapsulation, prodrug design, and use of sweeteners and flavour enhancers are explored. Considerations related to physiological differences in pediatric patients, regulatory perspectives, and the importance of patient-centric design are also discussed. Here, the highlight is the application of advanced taste-masking technologies in various pediatric delivery systems, including liquid formulations, orally disintegrating tablets, and chewable dosage forms. Overall, the integration of innovative taste-masking strategies with pediatricfriendly formulations is essential to enhance medication acceptability, ensure adherence, and support safe and effective therapy in children.

Keywords: Pediatric dosage forms; taste masking; palatability; patient compliance; microencapsulation; ion-exchange resins; inclusion complexes; pediatric drug delivery; orally disintegrating tablets; chewable dosage forms.

Abstract Id: PCEU/OP/09

Formulation Development, Optimization, and Characterization of Drug Phospholipid Complex Based Nanoemulsion Drug Delivery System

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Abstract

Migraine represents a debilitating neurological disorder requiring innovative therapeutic interventions. This study presents the rational design and development of a novel drug-phospholipid complex-based nanoemulsion delivery system for rizatriptan and cannabidiol to enhance acute migraine treatment. Conventional oral formulations face significant pharmacokinetic challenges, including poor aqueous solubility, low bioavailability, and extensive hepatic first-pass metabolism, which limit therapeutic efficacy. The phospholipid complexation strategy enhances drug lipophilicity and membrane permeability, while nanoemulsion technology provides superior solubilization and absorption characteristics. Formulation development involved systematic solubility profiling, drug-excipient compatibility studies, and optimal selection of oil phase, surfactants, and co-surfactants. Box-Behnken statistical design optimized three critical variables—oil concentration, surfactant-to-co-surfactant ratio, and aqueous phase content—based on particle size, polydispersity index, and drug entrapment efficiency. Characterization using FTIR spectroscopy, differential scanning calorimetry, and dynamic light scattering confirmed successful complex formation and nanoemulsion stability.

In vitro drug release studies using Franz diffusion cells demonstrated sustained release kinetics over 24 hours. Ex vivo permeation studies across goat buccal mucosa revealed significantly enhanced drug permeability compared to conventional formulations, indicating effective hepatic metabolism bypass through buccal absorption. The optimized nanoemulsion exhibited mean particle size below 200 nm, narrow size distribution (PDI < 0.25), and encapsulation efficiency exceeding 85%.

This investigation demonstrates that drug-phospholipid complex-based nanoemulsion technology offers a promising translational approach for acute migraine management, providing enhanced bioavailability, improved stability, and rapid onset of action with reduced dosing frequency, thereby addressing critical therapeutic gaps in current migraine management strategies.

Keywords: Rizatriptan, Cannabidiol, Drug-Phospholipid Complex, Migraine, Optimization, Box-Behnken Design.

Abstract Id: PCEU/OP/10

Emerging Trends in Antifungal Herbal Therapies and Formulation Strategies: A Review

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Abstract

Fungal infections represent a growing global health threat, driven by rising antifungal resistance, immunocompromised populations, and limited therapeutic options. The current review synthesizes recent evidences on the significance of antifungal herbs as viable alternatives or adjuncts to conventional antimycotics. We examine medicinal plants from diverse phytochemical classes—terpenoids, phenolics, alkaloids, and essential oils—highlighting key examples such as garlic (*Allium sativum*; allicin disrupts membranes and biofilms), neem (*Azadirachta indica*; azadirachtin targets dermatophytes), turmeric (*Curcuma longa*; curcumin inhibits ergosterol and efflux pumps), oregano (*Origanum vulgare*; carvacrol/thymol MICs 0.1–0.5 mg/mL), and tea tree (*Melaleuca alternifolia*; terpinen-4-ol for topical dermatophytosis). Mechanisms include membrane disruption, ergosterol inhibition, efflux pump blockade, and biofilm suppression. *In vitro* and *in vivo* studies demonstrate potent activity against *Candida albicans*, *Aspergillus* spp., *Cryptococcus neoformans*, and dermatophytes, often with MICs comparable to or lower than fluconazole or amphotericin B. Clinical data support validated formulations such as neem oil emulsions (5–10%; 80–90% cure in Tinea), garlic extract capsules (1.3% allicin; systemic candidiasis adjunct), oregano oil nanoemulsions (4–8-fold MIC reduction in resistant strains), curcumin–piperine complexes (synergistic with fluconazole), and polyherbal ointments (neem + turmeric + tea tree; superior to clotrimazole in *Tinea corporis*). We address challenges in standardization, bioavailability, and herb–drug interactions, while emphasizing ethnobotanical guidance in drug discovery. This review underscores the untapped potential of antifungal herbs and formulations in combating resistance and advocates for rigorous clinical trials and pharmacodynamic studies to integrate herbal therapeutics into modern antifungal strategies.

Keywords: Fungal infection, Anti-fungal, Herbs, Herbal formulation, *Allium sativum*

Abstract Id: PCEU/OP/11

Role of AI in Developing Personalized Drug Delivery Systems

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Abstract

Artificial intelligence (AI) is transforming personalized drug delivery by enabling precise, safe delivery of therapeutic agents to individual medical needs. By processing multilayer biomedical data-including genomics, proteomics, clinical biomarkers, imaging information, and physiological monitoring-AI-driven systems, such as machine learning and neural networks, can accurately predict drug response, optimize dosage, and support patient-specific formulations, advancing precision medicine. AI also plays a pivotal role in formulation design and improvement, demonstrating the ability of AI systems to model key formulation parameters such as solubility, stability, drug-excipient interactions, and systemic kinetics. AI algorithms can evaluate and predict critical parameters far more efficiently than traditional trial-and-error methods, significantly accelerating formulation development and reducing experimental uncertainty. AI-driven computational platforms enhance the design of nanocarriers, hydrogels, smart polymers, and implantable or wearable devices, paving the way for stimulus-responsive release. Such adaptive systems respond to real-time physiological cues, allowing personalized and precise drug release for complex conditions including cancer, diabetes, cardiovascular, and neurodegenerative disorders. Despite these advances, challenges remain in data quality, algorithm transparency, regulatory validation, and ethical governance. Enhancing secure data sharing, reducing algorithmic bias, and developing standardized validation pathways are essential. Interdisciplinary collaborations across computational sciences, pharmaceuticals, and clinical fields will accelerate clinical translation of AI-enabled personalized drug delivery systems.

Keywords: AI-based drug delivery, precision medicine, machine learning, nanocarriers, biomaterials, real-time sensing, controlled release, PK/PD modeling, adaptive drug systems, real-time monitor.

Abstract Id: PCEU/OP/12

A Comprehensive Study on Bilosomes : Formulation, Optimization and Stability Evaluation

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Bilosomes are novel, bile salt-stabilized vesicular drug delivery systems designed to enhance the stability, permeability, and bioavailability of therapeutic agents. Structurally similar to liposomes, bilosomes are composed of non-ionic surfactants, cholesterol, phospholipids, and bile salts such as sodium deoxycholate or sodium taurocholate. The incorporation of bile salts imparts greater stability against enzymatic degradation and pH variations in the gastrointestinal tract, making bilosomes particularly suitable for oral and transdermal delivery of drugs, vaccines, and biomolecules. The formulation of bilosomes typically involves methods like thin-film hydration, sonication, or solvent evaporation, followed by optimization of parameters such as vesicle size, zeta potential, and entrapment efficiency. Evaluation studies include physicochemical characterization, drug content determination, in-vitro release profiling, stability testing, and ex-vivo or in-vivo permeation studies to assess bioavailability enhancement. Compared to conventional vesicular systems such as liposomes and niosomes, bilosomes offer improved encapsulation efficiency, stability in bile-rich environments, and superior mucosal absorption. Recent studies highlight their promising applications in the delivery of vaccines, peptides, antifungal, and anticancer drugs. Overall, bilosomes represent an advanced, biocompatible, and versatile platform for controlled and targeted drug delivery, capable of overcoming several limitations associated with traditional vesicular carriers.

Keywords- Bilosomes , Permeability, Encapsulation effieciency, Optimization.

Abstract Id: PCEU/OP/13

Lipid Nanocarriers for Accelerated Drug Delivery

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Abstract
Lipid nanocarriers represent a cutting-edge approach for accelerated and efficient drug delivery. Comprising biocompatible lipids, these nanocarriers enhance drug solubility, stability, and permeability, enabling rapid absorption and targeted release at the desired site of action. Their nanoscale size allows for faster cellular uptake and improved bioavailability, leading to quicker therapeutic responses. Systems such as solid lipid nanoparticles (SLNs), nanostructured lipid carriers (NLCs), and liposomes are widely explored for delivering both hydrophilic and lipophilic drugs. This presentation discusses the design, mechanism, and advantages of lipid nanocarriers in accelerating drug delivery, highlighting recent advancements and their potential to revolutionize modern therapeutics through faster, safer, and more effective treatment outcomes.

Keywords: nanostructured lipid carriers, SLNs, liposomes etc.

Abstract Id: PCEU/OP/14

SmartLipids: Advancing Lipid Nanoparticle Systems for Enhanced Drug Delivery Performance

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Abstract:
The emergence of nanotechnology has revolutionized the landscape of drug delivery, enabling precise control over pharmacokinetics, stability, and targeted release. Among the diverse lipid-based carriers, *SmartLipids* represent a novel class of next-generation nanoparticles that combine the advantages of solid lipid nanoparticles (SLNs) and nanostructured lipid carriers (NLCs) while overcoming their inherent limitations. SmartLipids are composed of a complex blend of multiple solid and liquid lipids that form an imperfect, dynamic crystalline matrix, allowing for superior drug loading capacity, enhanced physical stability, and controlled release profiles.
The adaptive structure of SmartLipids enables protection of labile bioactive and compatibility with both hydrophilic and lipophilic compounds. Moreover, recent advances demonstrate their applicability beyond pharmaceuticals, including in nutraceuticals, cosmetics, and vaccine delivery systems.
Preclinical and in vitro studies have shown that SmartLipids can achieve sustained drug release, improved bioavailability, and enhanced targeting efficiency with minimal cytotoxicity. Their scalability and regulatory compliance further position them as a promising platform for industrial translation.
In conclusion, SmartLipids embody the next evolutionary step in lipid nanoparticle technology bridging innovation and practicality to address the growing demands of precision medicine and advanced therapeutic delivery.

Keywords: SmartLipids, lipid nanoparticles, Drug delivery, Nanocarriers, Bioavailability. Nanotechnology

Abstract Id: PCEU/OP/15

Advances in Transferosome-Based Intranasal Drug Delivery for Schizophrenia Treatment.

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Abstract
Schizophrenia is a chronic psychiatric disorder that demands long-term therapy to control symptoms and prevent relapse. Conventional oral and injectable routes of antipsychotic drug delivery often suffer from poor compliance, first-pass metabolism, systemic side effects, and limited brain bioavailability. To overcome these challenges, intranasal drug delivery has emerged as a promising alternative, offering direct transport to the brain via olfactory and trigeminal pathways while bypassing the blood–brain barrier. Among novel carriers, transferosomes—ultradeformable lipid vesicles composed of phospholipids and edge activators—have attracted considerable attention for improving drug penetration and therapeutic efficacy.Transferosomes possess distinct advantages such as high encapsulation capacity for hydrophilic and lipophilic drugs, enhanced membrane permeability, improved stability, and the potential for sustained release. These attributes make them particularly suitable for antipsychotic drugs, many of which have poor solubility and restricted brain availability. Methods like thin-film hydration, ethanol injection, and reverse-phase evaporation are widely used for their preparation, followed by evaluation through particle size, entrapment efficiency, deformability index, drug release, and ex vivo permeation studies. However, challenges such as stability issues, large-scale production, and possible nasal mucosal irritation remain barriers to clinical application.This review discusses the recent progress in transferosome-based intranasal drug delivery systems for schizophrenia, emphasizing formulation approaches, evaluation parameters, therapeutic outcomes. By integrating nanocarrier technology with the intranasal route, transferosomes offer a potential breakthrough for enhancing brain targeting, reducing systemic side effects, and improving patient adherence, ultimately contributing to better management of schizophrenia.

Keywords: Schizophrenia, Intranasal delivery, Transferosomes, Antipsychotic drugs, Brain targeting, Nanocarriers, Drug delivery systems.

Abstract Id: PCEU/OP/16

"Revolutionizing Breast Cancer Therapy: 3D-Printed Microneedles for Targeted and Painless Drug Delivery"

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Abstract

Breast cancer continues to be one of the most prevalent and deadly cancers in women, emphasizing the need for creative and less invasive treatment options. Traditional chemotherapy methods can produce serious side effects for patients, deliver drug to the area of treatment without a direct approach, and are delivered by route of pain and inconvenience. To address these limitations, recently microneedle (MN) technology has emerged as a feasible approach for delivery of drug therapy through the skin by a minimally invasive, painless, controllable, and precise approach.

In this study, microneedle arrays were constructed using advanced 3D printing technology allowing targeted breast cancer therapy. This fabrication technique provides precision regarding microneedle size, shape, and arrangement creating uniformity, design flexibility, and low-cost opportunity for large scale production. The structure of these microneedles will pierce outward on the skin to the externally delivering therapeutic agents. The unique feature of these microneedles is that the therapeutic agents would be delivered through a sustained-release manner for localized drug delivery through the erected entry into the tissue.

The microneedle system created using 3D printing has many benefits, such as decreased overall side effects, increased patient comfort and compliance, increased bioavailability of drugs, and the potential for self-administration, minimizing the need for clinician assistance. Additionally to breast cancer, this technology can also be used for the delivery of vaccines, hormones, peptides, and drugs for treatment of chronic infectious diseases.

In summary, 3D-printed microneedle technology represents an innovative step forward in transdermal drug delivery. It combines precision we engineered technologies with patient comfort, providing a safe, non-invasive device that offer a personalized platform for efficacious localized therapy and future biomedical applications.

Keywords: 3D Printing, microneedles, targeted drug delivery

Abstract Id: PCEU/OP/17

Dendrimer: A Novel Drug Delivery System

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Abstract

The main objective of this review is to describe the importance of dendrimer prodrugs in the design of new drugs, presenting numerous applications of these nanocomposites in the pharmaceutical field. Therefore, the use of dendrimer prodrugs as carrier for drug delivery, to improve pharmacokinetic properties of prototype, to promote drug sustained-release, to increase selectivity and, consequently, to decrease toxicity, are just some examples of topics that have been extensively reported in the literature, especially in the last decade. Dendrimers are branched polymeric nanoparticles, and have been investigated for a range of biomedical applications such as drug and gene delivery, due to the possibility for precise control over their physicochemical properties. Their size, shape and surface charge can be tuned for bypassing the cellular membrane, forming complexes with DNA , and solubilising hydrophobic drugs. Dendrimers

are not only capable of delivering drugs or diagnostic agents to desired sites by encapsulating or conjugating them to the periphery, but also have therapeutic efficacy in their own. When compared to traditional polymers for drug delivery, dendrimers have distinct advantages, such as high drug-loading capacity at the surface terminal for conjugation or interior space for encapsulation, size control with well-defined numbers of peripheries, and multivalency for conjugation to drugs, targeting moieties, molecular sensors, and biopolymers. This review focuses on recent applications of dendrimers for the development of dendrimer-based nanomedicines for cancer, inflammation, and viral infection. Although dendrimer-based nanomedicines still face some challenges including scale-up production and well-characterization, several dendrimer-based drug candidates are expected to enter clinical development phase in the near future.

Keywords:- dendrimer; prodrugs; targeted dendrimer ; gene delivery; conjugating traditional polymer .

Abstract Id: PCEU/OP/18

Insights into Pharmacological Activities and Nanotechnological Approaches for the Delivery of Polyphenols in Wound Healing

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Abstract

Polyphenols are a family of molecules with a wide range of biological activities. They are a significant source of novel compounds with therapeutic potential, including those that can be used for wound healing. The regeneration process is impeded by chronic wounds, which affects the therapeutic strategies that must be used. Additionally, these wounds result in a significant reduction in the patients' quality of life and associated expenses. Infection is a major risk factor for chronic wounds, which can ultimately result in septicemia and morbidity. Antibiotic resistance is rising as a result of traditional medicines, and this issue is growing more serious than only chronic wounds. Consequently, research into novel antimicrobial polymeric systems and chemicals that may serve as efficient substitutions for existing ones that can lessen infection even at lower concentrations is necessary. Because of their biological potential, polyphenols including hesperidin, chlorogenic acid, quercetin and curcumin, can effectively replace commercial antibiotics, which addresses the need for novel approaches to the treatment of chronic wounds. However, phenolic compounds may present some disadvantages in the context of wound applications, including limited stability and, therefore, reduced biological activity at the wound site. To get over these restrictions, polymer based systems have been developed as polyphenol carriers for wound repair. Performance and effectiveness are improved by these systems via stabilizing the polyphenols and controlling their release kinetics. This article tries to provide a general overview of the biological potential of polyphenol compounds as organic antibacterial agents and ways to stabilize and administer them to treat chronic wounds, with an emphasis on possible smart and bio-based wound dressings. Since they may function as carriers to enhance polyphenol bioavailability at the site in various formulation types, polymer-based particulate solutions are highlighted here.

Keywords: Polyphenols; Wound healing; Nanotechnology; Skin lesions; Nano delivery.

Abstract Id: PCEU/OP/19

Nanoparticle-Mediated Targeted Drug Delivery: Overcoming Physiological Barriers in Cancer Therapeutics

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Abstract:

Polymeric nanoparticles (NPs) represent an innovative solution to overcome limitations of conventional chemotherapy, including poor bioavailability, systemic toxicity, and lack of tumor selectivity. PLGA, PLA, and PEG-based nanoparticles (20–200 nm) are designed and characterized through controlled preparation methods (emulsification-solvent evaporation, nanoprecipitation) achieving >85% encapsulation efficiency and predictable drug release kinetics. Enhanced bioavailability—up to 18-fold over conventional drugs—results from increased surface area, protection from enzymatic degradation, and controlled release mechanisms. Passive targeting exploits the enhanced permeability and retention (EPR) effect, wherein tumor neovascularization enables nanoparticle extravasation and accumulation (up to 60%ID/g). Active targeting employing receptor-specific ligands (folate, transferrin, RGD peptides, antibodies) enhances cellular uptake 2–10-fold and reduces IC50 values 2–5-fold in vitro compared to non-targeted systems. Specialized applications include blood-brain barrier (BBB) penetration via ultra-small NPs (10–30 nm), receptor-mediated transcytosis, and intranasal delivery for neurodegenerative disease treatment. Cellular uptake proceeds through multiple endocytic pathways, with efficiency directly correlating with targeting ligand density and physicochemical properties. Clinical validation is demonstrated by FDA-approved Doxil and ongoing trials of CRLX101 and BIND-014. Stimulus-responsive "smart" nanoparticles incorporating pH, enzyme, and redox-triggered release enable precision drug liberation at tumor microenvironments. Comprehensive analytical characterization (DLS, TEM, FTIR, HPLC) ensures formulation quality and supports drug release modeling. Integration of theragnostic capabilities enabling personalized, monitored treatment represents the future of cancer therapeutics, bridging formulation science with analytical chemistry expertise.

Keywords: Nanoparticles; PLGA; Cancer Drug Delivery; Targeted Therapy; EPR Effect; Bioavailability; Blood-Brain Barrier; Encapsulation; Analytical Characterization; Theragnostic; Personalized Medicine, etc.

Abstract Id: PCEU/OP/20

Colon-Targeted Drug Delivery: Strategies, Innovations, and Clinical Applications

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Abstract:
Colon-Targeted drug delivery systems (CTDDS) have gained significant importance for delivering therapeutic agents, targeting both local diseases and systemic conditions. The colon provides a unique site for drug delivery due to its reduced enzymatic activity and neutral pH, enabling the effective delivery of drugs like proteins, peptides, and non-peptide agents. CTDDS minimize unwanted systemic side effects, including organ damage and respiratory or cardiovascular issues, while protecting drugs from premature release in the stomach or small intestine.
Colon targeting has proven beneficial for treating conditions such as inflammatory bowel disease, irritable bowel syndrome, colorectal cancer, and systemic delivery of therapeutic agents like insulin, calcitonin, and cardiovascular drugs. Various approaches have been developed, including conventional systems like prodrugs, pH-dependent, time-controlled, and matrix-based systems, as well as advanced technologies such as pulsincap, osmotic-controlled systems, and nanotechnology-based systems.
Biodegradable hydrogel-based polymers, including amylose, chitosan, and pectin, have shown success in optimizing drug release. Moreover, advances in combining conventional and novel approaches have enhanced efficacy and site-specific drug delivery by utilizing colonic enzymes and microbial metabolism to activate drug carriers.
The integration of novel and conventional techniques offers an optimized approach to drug delivery, paving the way for innovative treatments of colonic and systemic diseases.

Keywords: Colon-targeted drug delivery systems (CTDDS), Therapeutic proteins and peptides, Conventional and novel approaches, Colonic diseases

Abstract Id: PCEU/OP/21

Development of Nanoparticles for Antimicrobial Drug Delivery

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Abstract
This review focuses on the development of nanoparticle systems for antimicrobial drug delivery. Numerous antimicrobial drugs have been prescribed to kill or inhibit the growth of microbes such as bacteria, fungi and viruses. Even though the therapeutic efficacy of these drugs has been well established, inefficient delivery could result in inadequate therapeutic index and local and systemic side effects including cutaneous irritation, peeling, scaling and gut flora reduction. Nanostructured biomaterials, nanoparticles in particular, have unique physicochemical properties such as ultra small and controllable size, large surface area to mass ratio, high reactivity, and functionalizable structure. These properties can be applied to facilitate the administration of antimicrobial drugs, thereby overcoming some of the limitations in traditional antimicrobial therapeutics. In recent years, encapsulation of antimicrobial drugs in nanoparticle systems has emerged as an innovative and promising alternative that enhances therapeutic effectiveness and minimizes undesirable side effects of the drugs. Here the current progress and challenges in synthesizing nanoparticle platforms for delivering various antimicrobial drugs are reviewed. We also call attention to the need to unite the shared interest between nanoengineers and microbiologists in developing nanotechnology for the treatment of microbial diseases.

Keywords: Antimicrobial delivery; dendrimers; liposomes; microbes; polymeric nanoparticles; solid lipid nanoparticles

Abstract Id: PCEU/OP/22

Green-Synthesized Metallic Nanoparticles: A Promising Biogenic Approach for Cancer Treatment

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Abstract
Cancer remains one of the most challenging diseases to treat due to the severe toxicity, resistance, and lack of selectivity associated with conventional chemotherapeutic agents. Recent advances in nanotechnology have introduced metallic nanoparticles as potential alternatives for targeted cancer therapy; however, their chemical synthesis often involves hazardous reagents, raising concerns about safety and environmental impact. Green synthesis of metallic nanoparticles (GMNPs) using plant extracts provides a sustainable, biocompatible, and cost-effective alternative. Phytochemicals such as flavonoids, alkaloids, and phenolics act as natural reducing and stabilizing agents, eliminating the need for toxic chemicals and generating nanoparticles with excellent stability and functional surface groups. These surface biomolecules not only enhance the nanoparticles' dispersion and bioavailability but can also impart intrinsic anticancer properties through mechanisms such as reactive oxygen species generation, apoptosis induction, and inhibition of tumor proliferation. The use of GMNPs in cancer treatment represents a convergence of biotechnology and nanomedicine, offering selective cytotoxicity toward cancer cells, reduced systemic toxicity, and improved therapeutic index. This approach emphasizes an environmentally responsible and biologically safer route for future anticancer nanotherapeutic development.

Abstract Id: PCEU/OP/23

From Discovery to Delivery: Pharmacovigilance Ensuring Safe Therapeutic Outcome

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Abstract

Adverse drug reactions (ADRs) significantly affect the entire lifecycle of pharmaceuticals and are a major public health concern, often resulting in increased patient morbidity, mortality, and healthcare costs. Every phase of the medication lifecycle, from initial development to post-marketing surveillance, is significantly impacted by adverse drug reactions (ADRs). Early indications of adverse drug reactions (ADRs) during preclinical and clinical trials may lead to dose alterations, study modifications, or abandonment. Regulators may mandate more thorough safety investigations or limit progress to the next phase if notable adverse drug reactions (ADRs) are reported in Phase II or III trials. Serious adverse drug reactions (ADRs), like organ damage or life-threatening reactions, might stop development and lead to regulatory action, particularly if they recur throughout phases. Decisions like terminating drug trials, suspending market authorization, or permanent withdrawal depend on risk assessment and regulatory thresholds.Upon market approval, systematic pharmacovigilance is key to ongoing safety evaluation, relying on spontaneous ADR reporting and signal detection to uncover rare, serious, or long-term reactions not seen in controlled studies. Regular ADR monitoring enables prompt risk-benefit reevaluation, which frequently leads to stronger warnings, updated labeling, limited indications, or in extreme situations, the product's removal from the market. Pharmacovigilance programs such as the Pharmacovigilance Programme of India (PVPI) drive this process by proactively collecting, assessing, and acting on ADR data throughout a drug's lifecycle. Their efforts guarantee early detection of safety signals, quick implementation of actions, and patient safety at every stage of development. Termination rules are invoked when ADRs outweigh the therapeutic benefits. In summary, ADRs shape every drug lifecycle stage, with vigilant reporting and proactive management being essential for safe and effective therapies.

Keywords: Adverse drug reactions (ADRs), Drug lifecycle stages, PVPI, ADR reporting, Signal detection, Safety monitoring

Abstract Id: PCEU/OP/24

INTRODUCTION TO 3D AND 4D PRINTING TECHNOLOGY : STATE THE ART AND RECENT TRENDS

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Abstract

The world and science are moving forward nonstop. Every day, we see novel technologies are coming to improve life quality. 3D and 4D printing are rapidly evolving technologies, which offer one of the most promising and revolutionary manufacturing options. It is an attempt to meet the constantly rising manufacturing demands of complex materials in an efficient way. The development of active structures possessing the potential to change shape with respect to time. 3D printing, has revolutionized the manufacturing landscape by enabling the intricate layer-by-layer construction of three-dimensional objects and structures are perceived as static, 4D printing introduces the ability to fabricate materials capable of self-transforming their configuration or function over time in response to external stimuli such as temperature, light, or electric field. It's potential to facilitate disease modeling and drug testing via the creation of anatomically correct organoid models, and novel tissue engineering paradigms. The four major materials, i.e., polymers, metals, ceramics, and biomaterials and describe acturing process of 3D printing and 4D printing materials, their characteristics, applicable printing technologies, and clinical application scope are described in detail.

This offers insights into potential challenges faced in the additive manufacturing of polymer composites and suggests avenues for future research in this dynamic and rapidly evolving field. The emphasize will be on the interactions between various types of stimuli (categorized under physical, chemical and biological signals) with the associated stimulus-responsive materials, followed by technical considerations as well as outlook for future discoveries..

Keywords:- 3D and 4D printing , shape memory materials , self – transforming , biomateials , novel technology

Abstract Id: PCEU/OP/25

Title: Nanoparticle-Mediated Targeted Drug Delivery Across the Blood–Brain Barrier

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Abstract:
The blood-brain barrier (BBB) is a highly selective endothelial interface that protects the central nervous system by preventing the majority of bloodborne chemicals from entering brain tissue. Its tight-junction topology eliminates over 98% of small-molecule medicines and nearly all macromolecules, significantly limiting therapeutic choices for CNS diseases. Nanoparticle (NP) carriers provide a diverse technique for bypassing the BBB by utilizing endogenous transport pathways. Engineered nanoparticles can encapsulate medicinal compounds, increasing solubility, stability, and circulation time while avoiding efflux pumps. Surface modifications with targeted ligands facilitate entrance via receptor-mediated or adsorptive transcytosis. Key NP platforms include lipid-based carriers (e.g., liposomes, solid lipid nanoparticles), biodegradable polymers (e.g., PLGA), dendrimers, inorganic particles (e.g., gold, silica, iron oxide), and biomimetic vectors. Targeting techniques use ligands like transferrin, lactoferrin, or peptides to activate BBB receptors. Advanced designs incorporate stimuli-responsive carriers that initiate release in reaction to pH, enzymes, or temperature. These systems are being studied for the treatment of brain malignancies (e.g., glioblastoma) and neurodegenerative illnesses like Alzheimer's and Parkinson's. Emerging trends focus multifunctional and biomimetic nanocarriers with medicinal, targeted, and diagnostic properties. Cell-membrane-coated nanoparticles, for example, extend circulation and improve brain targeting. These nanoparticle-mediated delivery system developments have the potential to alter CNS medication therapy, providing new hope for overcoming the BBB's limitations.

Keywords: Blood–Brain Barrier (BBB),Nanoparticle Drug Delivery, Targeted Therapy, Receptor-Mediated Transcytosis, Lipid-Based Nanoparticles, Biodegradable Polymers (PLGA), Biomimetic Nanocarriers, Stimuli-Responsive Systems, Neurodegenerative Diseases, Glioblastoma.

Abstract Id: PCEU/OP/26

Liquisolid Compact Technique: Mechanistic Insights and Polymer-Based Approaches for Enhancing Solubility of Poorly Water-Soluble Drugs

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Abstract:
Poor aqueous solubility of Biopharmaceutics Classification System (BCS) Class II drugs remains a major challenge, limiting oral bioavailability and therapeutic efficacy. The liquisolid compact technique has emerged as a promising strategy to improve dissolution by transforming liquid drugs or drug solutions into dry, free flowing ,compressible powders using appropriate carriers and coating materials. Hydrophilic solvents such as polyethylene glycol (PEG200/ 400/600), propylene glycol, glycerin and hydrophilic carriers like Avicel PH101/102, starch, sorbitol and Aerosil 200 enhance drug wettability, surface area, and molecular dispersion, contributing to improved dissolution. Despite successful applications in non-antibiotic drugs such as naproxen, furosemide, and griseofulvin, antibiotics and multi-drug systems remain largely unexplored, representing a significant challenge or gap for pharmaceutical formulation.

This review highlights formulation principles, polymer selection, and underlying mechanisms—including increased wetting, reduced crystallinity (XRD/DSC), and drug-excipient compatibility (FTIR).
while identifying the critical research gap in antibiotic and combination drug applications. Liquisolid technology thus offers a cost-effective, scalable platform for enhancing solubility and bioavailability, with future potential for expanding its application to antibiotics and multi-drug formulations.

Keywords: Liquisolid compacts, Solubility enhancement, PEG 600, Avicel PH102, Mechanism, Antibiotics, Multi-drug formulations, BCS Class II drugs.

Abstract Id: PCEU/OP/27

A REVIEW OF NANO DRUG DELIVERY SYSTEM

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ABSTRACT

A multidisciplinary field of study called "drug delivery" seeks to make complex novel drug administration practical while also enhancing the effectiveness of pharmaceuticals already on the market. A marketplace Designing "Nano drug delivery systems" that can deliver medications to the proper location at the right time is now one of the most alluring areas of drug delivery research. Different nanocarriers, including nanoparticles, Nano capsules, Nanocrystals, Nano emulsions, dendrimers, polymeric micelles, and nanotubes, are described in the current review paper. Medicines can be delivered via nanostructured drug carriers in addition to small- molecule drugs, proteins, and nucleic acids. It is possible to deliver these molecules to particular bodily regions, which will decrease. Materials in the nanoscale range are used as diagnostic instruments or to deliver therapeutic compounds to specific targeted regions in a controlled manner in nanomedicine and nano delivery systems, which is a relatively young but fast-emerging discipline. Multiple benefits of nanotechnology in the treatment of chronic human ailments include precision medication delivery that is site-specific and target-oriented. The use of nanomedicine (including chemotherapeutic medicines, biological agents, immunotherapeutic agents, etc.) in the treatment of various diseases has recently seen many notable applications. The current study, through an in-depth examination of the discovery and application of nanomaterials in increasing the efficacy of both new and traditional medications, provides an updated account of recent developments in the field of nanomedicines and nano-based drug delivery systems. Nanomedicine and nano delivery systems are a relatively new but rapidly developing science where materials in the nanoscale range are employed to serve as means of diagnostic tools or to deliver therapeutic agents to specifically targeted sites in a controlled manner. Nanotechnology offers multiple benefits in treating chronic human diseases through site-specific, and target-oriented delivery of precise medicines. Recently, there are a number of outstanding applications of nanomedicine (chemotherapeutic agents, biological agents, immunotherapeutic agents, etc.) in the treatment of various diseases.

Keywords: Targeted drug delivery utilizing nanocarriers (e.g., liposomes, nanoparticles) to improve therapeutic efficacy and reduce systemic toxicity.

Abstract Id: PCEU/OP/28

Bioengineered Synthetic-Natural Polymer Composite Nanofiber for Enhanced Tissue Regeneration

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Abstract

The present study focuses on the development of a novel polymeric nanofibrous scaffold for tissue regeneration. *Anacardium occidentale* (AOG), a natural polysaccharide, and polyvinyl alcohol (PVA), a synthetic polymer, were utilized to fabricate nanofiber mats using the electrospinning technique. To enhance the wound-healing potential, a bioactive compound was incorporated into the nanofiber formulation to improve its therapeutic efficacy. The prepared nanofiber mat exhibited a morphology closely resembling the native extracellular matrix, providing an ideal framework for cellular adhesion and proliferation. The incorporation of AOG along with the bioactive compounds significantly enhanced antimicrobial and anti-inflammatory properties through a synergistic mechanism. In comparison to PVA nanofibers, the AOG/PVA composite nanofiber demonstrated improved mechanical strength, which supports cellular growth, and an optimized contact angle suitable for tissue regeneration applications. Hemocompatibility and cytocompatibility assessment confirmed that the developed nanofiber was non-hemolytic and supported the proliferation of L929 fibroblast cells. Moreover, the nanofiber exhibited potent antimicrobial activity against *Staphylococcus aureus* and *Escherichia coli. In vivo* wound-healing studies further revealed accelerated dermal tissue regeneration, attributed to the inhibition of inflammatory responses, reduction of reactive oxygen species, suppression of microbial load, and enhanced collagen synthesis at the wound site. The findings suggest that the prepared AOG/PVA nanofiber holds great promise as a bioengineered scaffold for dermal tissue regeneration and in preventing the development of chronic wounds.

Keywords: Nanofiber, Tissue Regeneration, Polysaccharide, Anti-microbial activity.

Abstract Id: PCEU/OP/29

From Cactus to Capsule: Alginate Encapsulation of Opuntia-Amla for Natural Iron Delivery

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Abstract

IDA continues to prevail among more than one-third of the population worldwide, especially in females and adolescents. Conventional iron supplements are effective but suffer from low bioavailability and gastrointestinal intolerance. Natural sources of iron and vitamin C, such as Opuntia ficus-indica and Emblica officinalis (Amla), have a lot of scope; however, their bioactives are not stable during storage and processing.Objective: This study aims to develop and characterize a cost-effective calcium-alginate bead delivery system encapsulating Opuntia and Amla extracts to offer better stability, controlled release, and potential use as a natural anti-anemic nutraceutical. Methods: A 2 % w/v sodium alginate solution was mixed with Opuntia juice concentrate and Amla powder and ionically gelled in 2 % $CaCl_2$ to form spherical beads. Some process variables, such as crosslinking time, alginate viscosity, and drying method, were optimized. The beads were characterized for their encapsulation efficiency, moisture content, pigment retention ($\lambda max \approx 535$ nm), and stability over a period of 30 days under different conditions. Results: Optimum beads had presented regular spherical morphology, with > 70% pigment retention and <10% of residual moisture. The coloration was bright, with preserved mechanical integrity after 30 days under 25 °C. Encapsulation provided significant protection of betalains and phenolics from degradation in comparison with unencapsulated extracts.

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Abstract Id: PCO/PP/01
Histone Deacetylases and Their Inhibitors: Classification, Clinical Development, and FDA-Approved Therapeutic Indications

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Abstract
Histone deacetylases (HDACs) are vital regulators of gene expression and chromatin structure. Their abnormal over activity has been closely linked to the progression of various solid tumors, making them a significant focus in cancer research. HDAC inhibitors (HDACis) have shown clinical promise, particularly in treating hematological cancers, but their use in solid tumors has been limited by modest effectiveness and safety concerns. This review outlines the classification and biological roles of HDACs, the mechanisms behind HDAC inhibition, and the therapeutic advances made through combination treatments involving chemotherapy, targeted drugs, and epigenetic agents. Importantly, the discussion also considers how HDAC-based therapies can align with principles of sustainable development. By emphasizing the need for safer, more selective treatments that minimize harm to healthy cells and reduce long-term toxicity, the paper highlights the importance of developing cancer therapies that are not only effective but also responsible and sustainable. As cancer care evolves, integrating sustainability into drug development—through smarter design, improved delivery systems, and personalized strategies—offers a more balanced and forward-looking approach to managing solid tumors.

Keywords: Cancers, Toxicity, angiogenesis, Histone deacetylases.

Abstract Id: PCO/PP/02
Progress in Drug Repurposing for Novel Therapeutic Applications in Inflammatory Bowel Disease

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Abstract
Inflammatory Bowel Disease (IBD), which includes Crohn's disease (CD) and ulcerative colitis (UC), continues to pose a major clinical burden worldwide due to its rising incidence and the limitations associated with current therapeutic modalities. Drug repurposing has emerged as a strategic and cost-effective approach for identifying novel therapies by redirecting existing pharmaceuticals that were originally approved for unrelated indications. This paradigm offers several advantages, such as reduced development timelines, lower research and regulatory costs, and pre-established safety profiles. Current investigations in this field have concentrated on agents capable of modulating pivotal pro-inflammatory mediators implicated in IBD pathogenesis, including interleukins IL-1α, IL-1β, IL-6, IL-8, and tumor necrosis factor-alpha (TNF-α). Several repurposed agents have shown encouraging anti-inflammatory and immunomodulatory properties in preclinical and early-phase clinical evaluations. Noteworthy examples include metformin (an antidiabetic drug), quinacrine (an antimalarial agent), berberine (a plant-derived isoquinoline alkaloid),

carbocisteine (a mucolytic bronchodilator), Spiperone(an antipsychotic drug), Rivaroxaban (an anticoagulant) and Niclosamide. These compounds have demonstrated the capacity to ameliorate intestinal inflammation, oxidative stress and modulate immune responses. Ongoing research and validation studies are essential to fully elucidate their therapeutic potential and facilitate their integration into personalized IBD management strategies.

Keywords: Ulcerative colitis, Crohn's disease, Berberine, Quinacrine, Drug repurposing, Cytokine modulation.

Abstract ID: PCO/PP/03

Rewriting Sickle Cell with CRISPR

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Abstract

Sickle cell disease is an inherited monogenic disorder caused by point mutation in β-globin on chromosome 11 resulting in serious mortality and morbidity rate. One of the curative therapy for SCD was known to be hematopoietic stem cell transplantation typically from a matched related donor but available donor was still only 15% useful.

Use of CRISPR-Cas9 have paved the way for efficient HbF induction through the creation of artificial HPFH mutations editing of transcriptional HbF silencer and modulating epigenetic intermediates that governs HbF expression. With the help of RNA-guided clustered regularly interspaced short palindromic repeats-associated Cas9 (CRISPR-Cas9); the normal hematopoietic stem and progenitor cells (HSPCs) ,13 kb of the β-globin locus to mimic the naturally occurring Sicilian HPFH mutation were deleted. The efficiency of targeting deletion reached 31% in cells with delivery of both upstream and downstream breakpoint guide RNA -guided Staphylococcus aureus Cas9 nuclease (SaCas9). The erythroid colonies differentiated from HSPCs with HPFH deletion showed significantly higher γ-globin gene expression compared with colonies without deletion.

Keywords: Hematopoietic stem cells, Progenitor cell, CRISPR-Cas9, Monogenic disorder, Genetic Therepy, Gene Editing.

Abstract Id: PCO/PP/04

AI-Powered Healthcare: Bridging Technology and Human Well-being

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Abstract:

Artificial Intelligence (AI) is disrupting how diseases are diagnosed, treatments are devised and care is delivered in health care. AI systems can use machine learning, deep learning, and natural language processing to identify clinically relevant patterns from large amounts of unused data. Such capabilities are redefining the diagnosis process as earlier and more accurate diagnosis are becoming possible, and treatments may be individualized for an optimal intervention. Health care organizations can also track patient outcomes throughout their life to improve outcomes over longer time periods. Beyond clinical applications, AI still supports efficiency in health care with predictive analytics, workflow optimization and patient engagement tools. The speed at which AI is being adopted is concerning, as data security concerns, bias, transparency and ethical governance are all areas of concern. We present a reflection on how AI-based technologies are joining cutting-edge innovations and a human narrative. By outlining applications for AI in diagnostics, therapeutics and patient-centred care, and addressing some of the challenges and hopefulness of future AI in health care, we highlight the transformative role of AI in reimagining health care in a more precise, accessible and human way.

Keywords: Artificial Intelligence, Healthcare, Diagnosis, Treatment.

Abstract Id: PCO/PP/05

HUMAN PAPILLOMAVIRUS: MOLECULAR PATHOGENESIS AND THE PROTECTIVE ROLE OF GARDASIL VACCINE

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Abstract

Human Papillomavirus (HPV) is a small, double-stranded DNA virus belonging to the Papillomaviridae family and represents one of the most prevalent sexually transmitted infections globally. Over 200 HPV types have been identified, with approximately 40 affecting the anogenital region. While low-risk HPV types (e.g., HPV 6 and 11) are primarily associated with benign lesions such as genital warts, high-risk types (e.g., HPV 16 and 18) are oncogenic and implicated in cervical, anal, and oropharyngeal cancers. The virus infects basal epithelial cells via microabrasions, replicates episomally, and expresses oncogenic proteins E6 and E7, which inactivate tumor suppressors p53 and retinoblastoma (Rb), promoting uncontrolled cellular proliferation and genomic instability. HPV employs multiple strategies to evade immune detection, contributing to persistent infection and malignant progression. Preventive strategies against HPV infection are crucial, with vaccination being the most effective approach. Gardasil, a recombinant virus-like particle (VLP) vaccine, targets the L1 capsid protein of high-risk HPV types, stimulating a robust humoral immune response without viral DNA, thereby preventing infection. The quadrivalent and nonavalent formulations provide protection against the most common oncogenic and wart-causing HPV strains. Clinical evidence demonstrates that Gardasil vaccination significantly reduces HPV infection rates and the incidence of cervical precancerous lesions. These abstract highlights the molecular pathogenesis of HPV and underscores the critical protective role of Gardasil vaccination in public health. Understanding the viral mechanisms and immunoprophylactic strategies is essential for developing effective preventive and therapeutic interventions, particularly in high-risk populations.

Keywords: Human Papillomavirus, Gardasil vaccine, Oncoproteins, Cervical cancer, Virus – like particles

Abstract Id: PCO/PP/06

Gut–Brain Axis and Alzheimer's Disease: Therapeutic Interventions and Strategies

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Abstract

Alzheimer's disease (AD) is a progressive neurodegenerative disorder marked by memory loss, cognitive decline, and behavioural changes. Recent studies have identified a strong link between the gut microbiota and the brain, known as the Gut–Brain Axis (GBA). Disturbance in this microbial balance, called gut dysbiosis, can trigger neuroinflammation, oxidative stress, and accumulation of amyloid-beta (Aβ) plaques, leading to the onset and progression of Alzheimer's disease. This review-based study analyzes previous findings on how gut microbiota imbalance contributes to AD and explores the potential of probiotics and Exopolysaccharides (EPS) as therapeutic agents. Probiotics help restore gut balance, while EPS act as natural antioxidants that reduce inflammation and protect neurons. Dietary approaches like the Mediterranean diet and pharmacological treatments such as GV-971 have also shown promising effects in reducing brain inflammation and improving cognition. Findings suggest that maintaining a healthy gut microbiome can slow the progression of Alzheimer's and improve brain health. Hence, probiotics and EPS represent a natural, safe, and

promising therapy for Alzheimer's disease, offering a new direction in the prevention and management of neurodegenerative disorders.

Keywords: Alzheimer's, Amyloid-beta, Neuroinflammation, Probiotics, Inflammation.

Abstract Id: PCO/PP/07

Effect of nerolidol, cyclophosphamide and their combination on diethylnitrosamine-induced hepatocellular carcinoma in Wistar rats.

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Abstract

Hepatocellular carcinoma (HCC) is a leading cause of cancer-related deaths, often developing in individuals with cirrhotic liver disease. Cyclophosphamide (CP), a widely used anticancer drug, is limited in use due to its toxic effects on the liver, and other organs. Therefore, adjunct therapies are needed to be investigated to mitigate these toxicities. In this study, nerolidol (NER), a natural sesquiterpene alcohol, was evaluated alone and in combination with CP in a diethylnitrosamine (DEN)-induced HCC model in Wistar rats. Forty-two albino rats were divided into seven groups (n=6). Except for the control, NER, and CP per se groups, all animals received DEN (50 mg/kg, i.p.) once weekly for eight weeks to induce HCC, and followed upto 16th week. Treatment groups were administered NER (400 mg/kg), CP (50 mg/kg), and their combination (400 + 50 mg/kg, p.o.) daily for four weeks. Body, liver weights, number of hepatic nodules, haematological, biochemical, and histopathological parameters were assessed. DEN-treated rats showed significant increase in incidence and number of hepatic nodules, along with elevation in serum tumour markers, alpha-fetoprotein (AFP), carcinoembryonic antigen (CEA), liver enzymes (AST & ALP), and reduction in red blood cells (RBCs) and haemoglobin (Hb), indicating anaemia and hepatic damage. Decrease in superoxide dismutase (SOD) confirmed oxidative stress. Treatment with NER, CP, and particularly their combination, significantly reversed these alterations by reducing the incidence and number of hepatic nodules, and improving haematological, biochemical, and histological parameters. These results suggested the chemo preventive activity of NER, CP and their combination against DEN-induced Hepatocellular carcinoma in Wistar albino rats.

Keywords: Hepatocellular carcinoma, Diethylnitrosamine, Nerolidol, Cyclophosphamide and Wistar rats.

Abstract Id: PCO/PP/08

Approval of Inluriyo (imlunestrant) for ER-positive, HER2-negative, ESR1-mutated Advanced or Metastatic Breast Cancer

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Abstract

Breast cancer is the most frequently diagnosed malignancy and the leading cause of cancer-related death among women globally. It accounts for approximately 1 in 4 cancer cases and 1 in 6 cancer deaths among women. While the disease predominantly affects women, men represent about 1% of all breast cancer cases. The global burden continues to rise, influenced by lifestyle factors, genetic predispositions, and increased life expectancy. On September 25, 2025, the U.S. Food and Drug Administration (FDA) approved Inluriyo for the treatment of adults with ER^+, $HER2^-$, ESR1-mutated advanced or metastatic breast cancer who have experienced disease progression following at least one line of endocrine therapy. The approval was based primarily on the Phase III EMBER-3 trial (NCT04975308), which enrolled 874 adult patients with ER^+, $HER2^-$ locally advanced or metastatic breast cancer previously treated with an aromatase

inhibitor ± a CDK4/6 inhibitor. Endocrine-receptor positive (ER^+), HER2-negative ($HER2^-$) breast cancers represent a major subset of breast cancer. A significant mechanism of resistance to standard endocrine therapies (such as aromatase inhibitors and selective estrogen receptor modulators) is mutation of the estrogen receptor gene, ESR1, which leads to constitutive activation of the receptor and diminished response to hormonal therapies. Inluriyo (generic name: imlunestrant) is an oral selective estrogen receptor antagonist and degrader (SERD) developed by Eli Lilly and Company. It binds to the estrogen receptor (ER), blocks its activation, and promotes its degradation, thereby targeting ER-driven growth including in ESR1-mutant cancers.

Keywords: Breast cancer, Food and Drug Administration, Inluriyo, Endocrine therapies, Selective estrogen receptor antagonist.

Abstract Id: PCO/PP/09

Antidiabitic activity of syzygium cumini seeds extract for type- 2 diabetic mellitus

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Abstract
The metabolic syndrome known as diabetes is typified by abnormalities in the metabolism of proteins, fats, and carbohydrates. Dyslipidemia, which is frequently linked to diabetes, is a significant risk factor for macrovascular problems that can result in CAD and is a major cause of diabetes-related death. Researchers are drawn to plant-based medicines because of the difficulties of managing diabetes mellitus without experiencing adverse consequences. The saponins, glycosides, and flavonoids in Syzygium cumini seeds have been linked in numerous studies to their anti-diabetic and anti-hyperlipidemic effects. Therefore, it should be investigated further for its advantages. Examining how syzygium cumini seed powder affected type 2 DM patients' dyslipidemia was the goal 90% of people worldwide suffer from Type 2 diabetes, which is a very common condition. It is brought on by obesity, the emergence of peripheral insulin resistance, and pancreatic dysfunction. In contemporary medicine, diabetes can be treated with a variety of methods that try to regulate blood sugar levels. This review explains how several portions of Jamun, Syzygium cumini, are used to treat diabetes by regulating cholesterol and blood sugar levels. Several portions of the Myrtaceae family's jamun tree are widely known for their ability to lower blood sugar levels. For many generations, Indian traditional healers have used the leaves, bark, and fruits of this plant to treat diabetes patients. The goal of the current study is to create an antidiabetic activity of syzygium cumini.

Keywards: syzygium cumini, Phathophysiology, Anti-hyperlipidemic.

Abstract Id: PCO/PP/10

Unveiling the Silent Killer: An Insight into Hypertension and Its Management Strategies

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Abstract:
Hypertension, often described as the “silent threat,” continues to be one of the most significant contributors to cardiovascular morbidity and mortality worldwide. Despite remarkable medical advances, effective prevention and long-term control remain challenging, largely due to its multifactorial nature. This review examines how everyday factors- such as dietary habits, salt consumption, emotional stress, and sedentary lifestyles-interact in the development

and persistence of high blood pressure. Recent findings highlight the influence of psychosocial stress, disrupted sleep patterns, and excess sodium intake on vascular resistance and hormonal balance. At the same time, lifestyle-centered strategies such as the DASH (Dietary Approaches to Stop Hypertension) diet, regular physical activity, mindfulness, and community-based interventions are showing promising results in reducing both systolic and diastolic pressures. Pharmacological innovations, when combined with behavioural modification, offer a more holistic framework for patient-specific management. Rather than treating hypertension as a single clinical entity, the paper emphasizes understanding it as a dynamic process shaped by modern living patterns. Early awareness, personalized prevention, and integrated care models can collectively reduce the growing global burden of this condition.

Keywords: Hypertension, Cardiovascular Health, Integrated Care, Public Health.

Abstract Id: PCO/PP/11

Monoclonal Antibodies Targeting Amyloid-β: A Paradigm Shift in Disease Modifying Therapy for Early-Stage Alzheimer's Disease

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Abstract

Alzheimer's disease (AD) is a progressive neurodegenerative condition primarily defined by the deposition of extracellular amyloid-β (Aβ) plaques and intracellular neurofibrillary tangles composed of hyperphosphorylated tau, leading to gradual cognitive deterioration. Although AD is the predominant cause of dementia globally, no curative therapy exists . The amyloid cascade hypothesis has positioned Aβ accumulation as the upstream driver in AD pathology, spurring the clinical development of monoclonal antibodies (mAbs) as disease-modifying therapies (DMTs). These engineered mAbs are designed to engage and facilitate clearance of specific forms of Aβ . Lecanemab predominantly targets soluble Aβ protofibrils, whereas donanemab is specific to pyroglutamate -modified Aβ within plaques. Major Phase III trials (such as CLARITY-AD, TRAILBLAZER-ALZ 2) have demonstrated that these agents slow cognitive and functional decline by approximately 27–39% in early-stage . Despite these advances, safety challenges remain, notably amyloid-related imaging abnormalities (ARIA), including vasogenic edema and microhemorrhages, with increased risk among APOE ε4 carriers. Systematic reviews of late-stage trials underscore the clinical benefit and biomarker response (e.g., ADAS-Cog, PET and CSF/plasma p-tau levels) alongside ARIA risk profiles. The second-generation anti-Aβ mAbs have reaffirmed the amyloid hypothesis by achieving robust plaque reduction . While aducanumab achieved accelerated regulatory approval, it was subsequently withdrawn due to inconsistent clinical outcomes. Emerging innovations—including bispecific antibodies targeting both Aβ and tau, Fc-modified IgG4 antibodies, aim to optimize therapeutic profiles. The adoption of advanced biomarkers, such as plasma p-tau217, is refining patient selection and monitoring. Collectively, these advances herald a paradigm shift toward effective disease modification and long-term cognitive preservation in Alzheimer's disease.

Keywords: Alzheimer's disease , amyloid-β , monoclonal antibodies (mAbs) , biomarkers , second generation antibodies.

Abstract Id: PCO/PP/12

Emerging of Antibiotic Resistance and Their Impacts on Drug Development: An Overview

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Abstract

Antibiotic resistance (AMR) has emerged as one of the most serious global public health challenges of the 21st century. AMR occurs when viruses, bacteria, fungi and parasites do not respond to antimicrobial treatments in humans and animals, thus allowing the survival of the microorganism within the host. The rapid rise of multidrug-resistant pathogens threatens the efficacy of existing antimicrobial agents, leading to increased morbidity, mortality, and healthcare costs worldwide. The crisis is driven by multiple interdependent factors, including overuse and misuse of antibiotics in healthcare and agriculture, gaps in sanitation and infection control, and pronounced disparities in surveillance and laboratory infrastructure, particularly in low- and middle-income countries where resistance is rising fastest. Many challenges exist to improving antibiotic use and infection control in resource-limited settings, and turning the tide requires intensifying research and surveillance, antimicrobial stewardship, and developing new bedside diagnostic tools for bacterial infections and antimicrobial susceptibility. This review aims to provide a comprehensive overview of the mechanisms, causes, and current strategies to combat antibiotic resistance.

Keywords: antibiotic resistance, drug designing, bacterial mutation, bacterial evolution, public and agricultural health.

Abstract Id: PCO/PP/13

CHEMOTHERAPY IN CANCER TREATMENT: BALANCING THERAPEUTIC POTENTIAL AND SIDE EFFECTS

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Abstract:
Unchecked cell growth and proliferation are hallmarks of the complicated disease known as cancer. Chemotherapy drugs continue to be one of the main therapeutic choices; they work by destroying or preventing the proliferation of cancer cells through a variety of ways. These substances may work by preventing vital enzymes from functioning, preventing DNA replication, preventing mitosis, or triggering apoptosis. Since cancer is still one of the world's leading causes of death, effective and focused treatment approaches are necessary. Chemotherapy is essential for the treatment of cancer because it uses cytotoxic drugs to stop the growth and spread of cancerous cells. It remains one of the most popular and effective therapy modalities in spite of its negative consequences. Strong cytotoxic medications are used in chemotherapy to kill cancer cells. But these substances can also damage healthy tissues, and their exposure might endanger medical personnel. Strict safety procedures are therefore necessary to guarantee protection throughout administration, disposal, and preparation. Depending on the type of cancer, its location, the medications and dosage, and the patient's overall condition, each person may experience distinct side effects from chemotherapy. Chemotherapy has evolved in the modern period due to the utilization of significant molecular abnormalities in screening for targeted therapies and possible new medications. The mechanisms of action and therapeutic potential of chemotherapeutic drugs are examined in this poster.

Keywords: Chemotherapy, Cytotoxic drugs, Targeted therapy, Side effects, Supportive care.

Abstract Id: PCO/PP/14

AI-Assisted Drug Repurposing: Lessons from COVID-19 and Beyond

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Abstract

The COVID-19 pandemic revealed critical limitations in traditional drug discovery, which often requires several years and extensive financial investment before a new molecule reaches clinical use. In the face of an urgent global health crisis, the concept of drug repurposing—finding new therapeutic applications for existing, approved drugs—offered a faster and more practical alternative. In this context, Artificial Intelligence (AI) emerged as a powerful accelerator by integrating data from pharmacology, genomics, cheminformatics, and clinical research. AI and machine learning (ML) algorithms analysed large and complex datasets to predict drug–target interactions, evaluate molecular docking patterns, and identify compounds with potential antiviral properties. This strategy led to the rapid recognition of drugs such as remdesivir, dexamethasone, hydroxychloroquine, and baricitinib as potential candidates against SARS-CoV-2.

The success of AI-assisted drug repurposing during COVID-19 has now inspired similar applications in various disease areas, including cancer, neurological disorders, metabolic diseases, and autoimmune conditions. By using deep learning networks and predictive modeling, AI systems can identify hidden relationships between drugs and diseases, optimize pharmacokinetic and pharmacodynamic parameters, and improve therapeutic decision-making. Furthermore, AI-driven virtual screening has significantly reduced both the cost and time of experimental trials.

Despite these achievements, challenges such as data inconsistency, algorithmic bias, lack of interpretability, and limited clinical validation continue to restrict full-scale adoption. Addressing these concerns will be essential to ensure safety, transparency, and regulatory acceptance of AI-driven discoveries.

This poster highlights how AI transformed drug repurposing during the COVID-19 crisis, outlines the mechanisms that enabled its success, and discusses future prospects where AI could redefine drug discovery by offering faster, cost-effective, and patient-centred therapeutic solutions for global health emergencies.

Keywords: Artificial Intelligence, Drug Repurposing, COVID-19, Machine Learning, Deep Learning, Drug Discovery, Translational Research

Abstract Id: PCO/PP/15

AI Meets TB: Designing Next-Generation Peptide Therapeutics

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Abstract

Tuberculosis (TB) treatment remains a leading cause of death worldwide and is becoming more difficult due to the rise of multidrug-resistant strains. Mycobacterium tuberculosis is the causative agent of tuberculosis, an infectious disease that primarily affects the lungs but can spread to other organs. This work involves developing novel peptide-based therapies for Mycobacterium tuberculosis, utilizing artificial intelligence (AI) in drug discovery. To identify suitable peptide sequences that can bind to essential TB target proteins, Artificial intelligence is used to analyse huge datasets. AI models can discover new therapeutic peptides more quickly and precisely by learning from known peptide–protein interactions. Molecular docking and dynamics simulations were used to test a few peptides in order to verify their stability. To predict the binding affinity of peptides and their key interactions with the target proteins of Mycobacterium tuberculosis, molecular docking was employed. The peptide–protein interactions, stability, and flexibility under physiological conditions were then assessed using molecular dynamics simulations. the study demonstrates how AI can speed up the discovery of effective, targeted anti-TB peptides, paving the way for next-generation therapies.

Keywords: Mycobacterium tuberculosis, tuberculosis, multidrug resistant, peptide-based therapies, artificial intelligence, drug discovery, molecular docking.

Abstract Id: PCO/PP/16

Physicochemical Characteristics, Anti-Lipase and Antioxidant Activities of Polysaccharide Extracted from Astragalus spinosis Grown in the Northern Region of Saudi Arabia

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Abstract

Introduction: Northern Border region of Saudi Arabia is one of the richest areas of traditional plants. This study was designed with an interest to work on the polysaccharide extracted from Astragalus spinosis leaves (PLAS) collected from Rafha province. **Methods:** Polysaccharide was isolated by hot water extraction, followed by ethanol precipitation. The isolated crude polysaccharide contains 62.43% ±2.09% carbohydrate and 0.29 ± 0.07% protein. The physicochemical characteristics, such as chemical composition, humidity, foaming capacity, solubility as well as water and oil holding capacity were evaluated. The structural feature of polysaccharide was studied through Fourier transform infrared (FT-IR) analysis and scanning electron microscopy. **Results:** Polysaccharide extracted from Astragalus spinosis leaves showed good inhibitory lipase and antioxidant activities. It was observed that the total antioxidant capacity, the 1,1- diphenyl-2 picrylhydrazyl (DPPH) and the 2,2 -azino-bis-3-ethylbenzothiazoline-6-sulphonic acid (ATBS) radical scavenging activities were high at 2.0 mg/ml (97 µmol eq tocopherol ± 1.4, 73% ± 2.1 and 93% ± 0.9 respectively).

Conclusion: the crude polysaccharide extract demonstrated good emulsion stabilizing capacities, with various hydrophobic compounds. It could be a potential source of natural antioxidants and emulsifiers

Abstract Id: PCO/PP/17

Drug Safety and Clinical Pharmacy Practice in India

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Abstract

Clinical pharmacy ensures the safe, effective, and rational use of medicines in patient care. Drug safety is a key aspect of healthcare aimed at preventing medication errors and adverse drug reactions (ADRs). In India, clinical pharmacy practice has evolved from traditional dispensing to patient-centered care. Clinical pharmacists now contribute to rational drug use, therapy monitoring, and pharmacovigilance activities, ensuring the safe and effective use of medicines.To evaluate the role of clinical pharmacists in promoting drug safety and improving therapeutic outcomes in India. To emphasize the significance of clinical pharmacists in improving drug safety, therapeutic effectiveness, and patient outcomes in the Indian healthcare system.This study is based on a review of literature, hospital reports, and pharmacovigilance data highlighting the involvement of clinical pharmacists in ADR monitoring, prescription auditing, and patient counseling.Clinical pharmacists significantly reduce medication-related problems, enhance drug monitoring, and promote ADR reporting.

Their active role in pharmacovigilance programs, drug information services, and interprofessional collaboration improves patient safety and treatment success.

Clinical pharmacists are integral to safe medication practices in India. Strengthening their role through specialized training, policy support, and inclusion in healthcare teams will enhance drug safety, therapeutic outcomes, and public health quality.

Keywords: Clinical Pharmacy, Drug Safety, Pharmacovigilance, Medication, Errors, Patient Care, India.

Abstract Id: PCO/PP/18

"Herbal Medicines as Promising Therapeutic Agents in the Management of Hepatotoxicity"

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Abstract

Hepatotoxicity refers to liver damage or dysfunction caused by toxic agents such as drugs, alcohol, or environmental pollutants, resulting in oxidative stress, inflammation, and cellular necrosis. As the liver is the key organ for detoxification and metabolic regulation, its protection is vital. Conventional hepatoprotective drugs like S-Adenosyl Methionine (SAMe) and Ursodeoxycholic Acid (UDCA) are effective but often induce adverse effects such as diarrhea, nausea, weight gain, Gastrointestinal upset, insomnia and diabetes. This has led to increased interest in safer, plant-based alternatives. Several medicinal plants exhibit potent hepatoprotective and antioxidant activities, helping maintain normal liver function and regeneration. Notable examples include Silybum marianum (milk thistle), Phyllanthus niruri (bhui amla), Curcuma longa (turmeric), Glycyrrhiza glabra (licorice), and Tinospora cordifolia (giloy). Their bioactive compounds are silymarin, phyllanthin, curcumin, glycyrrhizin, and tinosporaside acts synergistically by scavenging free radicals, inhibiting lipid peroxidation, and enhancing antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT), and glutathione (GSH). They also suppress inflammatory mediators like TNF-α and IL-6 and modulate cytokine and fibrotic pathways to prevent hepatic inflammation and fibrosis. Thus, herbal medicines represent a promising, cost-effective, and sustainable approach for protecting and restoring liver function in hepatotoxic conditions.

Keywords: Hepatotoxicity; Hepatoprotective activity; Herbal medicine; Oxidative stress; Antioxidant enzymes; Phytoconstituents; Liver injury.

Abstract Id: PCO/PP/19

Artificial Intelligence In Patient Recruitment And Selection For Clinical Trials

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Abstract

Artificial Intelligence (AI) is changing the way clinical trials are done by making them faster, smarter, and more accurate. Traditional clinical trials often take years and cost millions because finding the right participants, collecting data, and analyzing results is complex and time-consuming. AI helps solve these problems by using smart computer programs that can learn from data and make predictions. Introduction Artificial Intelligence (AI) has emerged as a transformative tool in clinical research, addressing the limitations of conventional clinical trials. These trials traditionally face challenges such as lengthy timelines, high costs, and difficulties in identifying suitable participants. AI technologies, including machine learning and natural language processing, enable automated data analysis, predictive modelling, and improved patient matching. Materials and Methods This study reviews data from published literature, online databases, and clinical trial registries to understand the role of AI in trial management. Various AI algorithms were analyzed for their use in patient recruitment, trial monitoring, and data interpretation. Machine learning models were evaluated for their ability to predict patient response and identify potential adverse effects. AI tools were also assessed for their effectiveness in reducing manual workload and improving data accuracy. Conclusion AI is revolutionizing the design and execution of clinical trials by making process faster, more accurate, and cost-effective. It enhances every stage-form planning and recruitment to monitoring and analysis- by transforming large datasets into actionable insights. However, ethical issues, data privacy, and the need for standardized regulations must be addressed for broader adoption. With continued innovation, AI promises to make future clinical trials more efficient, patient-centered, and scientifically robust.

Keywords: ArtificialIntelligence; Clinical Trials; Data Analysis; Patient Recruitment; Drug Development; Clinical Research; Ethical challenges; Data Privacy; Precision Medicine.

Abstract Id: PCO/PP/20

Enhancing Patient Adherence: The power of Gamification in Pharma

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Abstract
Gamification is emerging as an innovative strategy to enhance patient education and improve adherence to medication regimens. By incorporating game design elements—such as points, rewards, challenges, progress tracking, and feedback—into healthcare interventions, gamification makes learning more engaging, interactive, and patient-centred. Mobile health applications and serious games like "MySugr" for diabetes management, "SuperBetter" for mental health resilience, and "Re-Mission" for cancer therapy adherence exemplify how playful elements can transform patient behaviour. These tools promote a deeper understanding of disease conditions, treatment goals, and proper medication use, while motivating patients to follow prescribed regimens. Gamified systems can reduce forgetfulness, enhance self-management skills, and foster positive health behaviours. Additionally, they improve communication between patients and healthcare providers and support long-term behavioural change by stimulating intrinsic motivation. Despite challenges such as age-related usability, digital literacy, and sustaining engagement, gamification holds significant potential to improve therapeutic outcomes and promote better health awareness.

Keyword: Gamification, Medication Adherence, Patient Education, Mobile Health Apps, Behavioural Change

Abstract Id: PCO/PP/21

Artificial Intelligence In Drug Discovery And Drug Development In Pharmacology

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Abstract
Artificial Intelligence is playing a major role in modern pharmacology, which is the study of drugs and theirs effects on the human body. It can predict how a drug will work in the body, find possible side effects, and even suggest the best drug and dose for each person.

Introduction
The discovery and development of new drugs and therapeutic strategies in pharmacology remain among the most complex. The world of pharmacology is undergoing significant change. Before compounds move into humans, AI models can predict how the compound will behave in the body, how it is metabolised, what toxicity risks may exist. This process is time-consuming, expensive and the chances of failure remain high.

Material And Methods
This study employs a range of AI techniques, including machine learning (ML), deep learning (DL), and natural language processing (NLP), to analyze pharmacological data. Data sources encompass chemical libraries, biological databases, clinical trial records, and real-world evidence. The AI models are trained to predict drug efficacy, safety profiles, and potential adverse reactions. Model performance is evaluated using metrics such as accuracy, precision, recall, and F1-score.

Conclusion

AI has demonstrated significant potential in revolutionizing pharmacology by accelerating drug development processes, improving the accuracy of clinical predictions, and facilitating
personalized medicine approaches. While challenges remain, such as data quality and regulatory considerations, the integration of AI into pharmacological research holds promise for more efficient and effective healthcare solutions.

Keywords: Artificial Intelligent, Machine Learning Drug discovery and development, Clinical Trials.

Abstract Id: PCO/PP/22

Quinoline Frameworks in Modern Breast Cancer Therapy: Mechanistic Targeting and Translational Development

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Abstract

Quinoline remains a privileged heterocyclic scaffold in anticancer research, with recent investigations (2022–2025) demonstrating strong therapeutic potential against multiple breast cancer subtypes. Structure–activity studies reveal that quinoline hybrids, including thiazole/thiazolidinone conjugates, nitric-oxide–releasing analogues, and kinase-targeted designs, exhibit potent antiproliferative effects in estrogen receptor–positive (MCF-7) and triple-negative (MDA-MB-231) breast cancer models. These derivatives operate through multifaceted mechanisms, including mitochondrial-mediated apoptosis, cell-cycle arrest at G1 or G2/M checkpoints, disruption of mitotic spindle assembly, and inhibition of DNA replication via Topoisomerase I blockade. Several analogues also demonstrate targeted inhibition of EGFR/HER2 signaling pathways, along with suppression of PI3K/Akt and MAPK cascades, contributing to effective control of tumor proliferation, invasion, and metastatic progression. Medicinal-chemistry optimization strategies, such as strategic fluorination, piperazine insertion, and kinase-hinge binding enhancement, have significantly improved potency, selectivity, and drug-like properties relative to early leads. Additionally, nanocarrier-based delivery systems and prodrug approaches are being explored to enhance bioavailability and tumor-selective accumulation. Despite this progress, challenges remain regarding metabolic stability, off-target toxicity, and resistance development, emphasizing the need for PK/PD-guided refinement and rational combination strategies, including pairing with endocrine therapy or CDK4/6 inhibitors. Overall, quinoline scaffolds represent a versatile and rapidly evolving chemotype with significant translational promise for developing next-generation targeted breast cancer therapeutics.

Keywords: quinoline, breast cancer, EGFR/HER2 inhibition, Topoisomerase I, tubulin polymerization, apoptosis, drug resistance.

Abstract Id: PCO/PP/23

Clinical trial regulation- ensuring safety and ethics

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Abstract

Clinical trials are essential to evaluate the safety, efficacy, and quality of new drugs before their approval and marketing. In India, clinical research is regulated under Schedule Y of the Drugs and Cosmetics Rules, 1945, and guided by Good Clinical Practice (GCP) and Indian Council of Medical Research (ICMR) ethical guidelines. These frameworks ensure that trials are conducted with scientific integrity, participant protection, and ethical transparency. By defining standards for protocol design, informed consent, monitoring, and reporting, these regulations safeguard

volunteer rights and strengthen public trust. Adherence to these guidelines is vital for ensuring safe, ethical, and globally accepted clinical research.

Keywords: Good Clinical Practice (GCP), Indian Council of Medical Research (ICMR) and Drugs and Cosmetics Rules

Abstract Id: PCO/PP/24

Clinical trials

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Abstract

Clinical trials are crucial scientific studies conducted to assess the safety, efficacy, and therapeutic potential of new drugs, medical devices, or treatment approaches in humans. They form the backbone of evidence-based medicine, ensuring that any new medical intervention is both safe and effective before it becomes available for public use. The process of clinical research follows a well-defined pathway, starting from preclinical studies and moving through Phases I to IV. Phase I trials primarily determine safety profiles and appropriate dosage levels, usually involving a small group of healthy volunteers. Phase II focuses on evaluating the initial effectiveness of the treatment and identifying short-term side effects in patients suffering from the targeted condition. Phase III involves a larger patient population to confirm the treatment's therapeutic benefits and gather comprehensive data for regulatory approval. Finally, Phase IV, also known as post-marketing surveillance, monitors the long-term safety, rare adverse reactions, and optimal real-world use of the intervention. All clinical trials are conducted in accordance with Good Clinical Practice (GCP) guidelines, ensuring ethical conduct, informed consent, and participant safety. In essence, clinical trials serve as a bridge between laboratory discoveries and clinical application, playing a vital role in improving healthcare and advancing medical science worldwide.

Keywords : Clinical trials, Safety, Efficacy, Therapeutic potential.

Abstract Id: PCO/PP/25

Investigation of Status Quo, Prospects, and Difficulties to Foster Biosimilars Pharmacovigilance in India

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Abstract

Globally, Biosimilars-which are extremely equivalent alternatives of pioneering biologics, have evolved as a key component for expanding patient access to affordable and life-saving therapeutics. India, as an expeditiously growing biosimilars market and manufacturing hub, has made noteworthy advancements in developing regulatory foundation and scientific processes to ensure the safety, efficacy, and quality of these complex biologics. This analysis critically examines the current status of biosimilars pharmacovigilance in India, focusing on the evolving regulatory guidelines established by the Central Drugs Standard Control Organisation (CDSCO), including recent draft updates aligned with global norms. Key areas considered include strategies for immunogenicity assessment, post-marketing surveillance, and risk management specific to biosimilars. Drawing from government resources, peer-reviewed literature, and industry reports, the review traces biosimilars development, highlights major manufacturing contributors, and evaluates prevailing pharmacovigilance practices. While notable progress has been achieved, on-going challenges such as under-reporting of adverse drug reactions, product traceability, regulatory harmonization, and limited stakeholder awareness remain. The review emphasizes opportunities to improve safety monitoring through digital

health innovations, enhanced collaboration, and risk-based scientific approaches, offering actionable insights for researchers, clinicians, and regulators to strengthen patient safety and market sustainability in India.

Keywords: Pharmacovigilance, Biosimilars, Regulatory Guidelines Immunogenicity, Risk management, Digital Health.

Abstract Id: PCO/PP/26

Harnessing Nature's Potential: Innovative Drug Strategies Against Osteoporosis

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Abstract:
Osteoporosis, a chronic and progressive metabolic bone disorder, poses a major global health challenge by increasing bone fragility and fracture susceptibility, particularly among postmenopausal women and elderly populations. Despite the availability of conventional antiresorptive and anabolic agents such as bisphosphonates, selective oestrogen receptor modulators, and parathyroid hormone analogues, their clinical use is often limited by adverse effects, poor bioavailability, and lack of long-term safety. This has led to an intensified search for alternative, nature-derived therapeutic approaches that offer efficacy with improved safety profiles. Natural bioactive compounds—such as curcuminoids from Curcuma species, flavonoids, polyphenols, and omega-3 fatty acids from Salvia hispanica—exhibit remarkable osteoprotective potential through multifaceted mechanisms. These include antioxidant and anti-inflammatory actions, suppression of osteoclast genesis, stimulation of osteoblast differentiation, and modulation of molecular pathways such as Wnt/β-catenin, BMP, and RANK/RANKL/OPG signalling. Recent advances in pharmaceutical technology have further enhanced the therapeutic promise of these agents. Novel formulations like nano emulsions, liposomes, and phytosomes significantly improve solubility, stability, and site-specific bone targeting, thereby increasing systemic bioavailability and therapeutic efficiency. The convergence of phytotherapy and nanotechnology provides a groundbreaking approach to bone health management—one that aligns natural efficacy with modern precision. Harnessing nature's pharmacological diversity through innovative delivery systems represents a transformative step toward safer, sustainable, and more effective interventions for osteoporosis prevention and treatment.

Keywords: Osteoporosis, Natural therapeutics, Phytoconstituents, Bone regeneration, Nano formulation, Osteoblast–osteoclast balance, Wnt/β-catenin signalling, RANK/RANKL/OPG pathway

Abstract Id: PCO/PP/27

Therapeutic potential of bee sting venom in breast cancer treatment"

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Abstract
Breast cancer remains the most prevalent malignancy among women worldwide, accounting for approximately 2.3 million new cases and nearly 685,000 deaths annually, as reported by the World Health Organization (WHO, 2023). Despite advances in chemotherapy, radiotherapy, and hormonal therapy, drug resistance and systemic toxicity continue to challenge effective treatment. Recently, natural bioactive compounds have gained attention for their targeted anticancer effects with reduced side effects. Among these, **bee venom (apitoxin)** has emerged as a promising therapeutic agent due to its potent biochemical constituents, including **melittin, apamin, adolapin, phospholipase A_2, and hyaluronidase**. Melittin, the principal component constituting about 40–60% of bee venom, exhibits strong cytotoxic activity against breast cancer cells by inducing apoptosis, disrupting cancer cell membranes, inhibiting cell

proliferation, and suppressing metastasis-related pathways such as NF-κB, PI3K/Akt, and MAPK. Phospholipase A_2 enhances melittin's membrane-permeabilizing effect, thereby amplifying its anticancer potency. Apamin and adolapin contribute to anti-inflammatory and neuroprotective actions, indirectly supporting cancer therapy by modulating the tumor microenvironment. Moreover, studies have indicated synergistic effects of bee venom or melittin in combination with conventional chemotherapeutics, enhancing drug sensitivity and reducing tumor growth. Thus, bee venom and its bioactive peptides represent a novel and promising avenue in **breast cancer therapeutics**, offering potential for the development of targeted and less toxic treatment modalities.

Keywords: Bee venom, Melittin, Breast cancer, Apamin, Phospholipase A_2, Anticancer therapy, Apitoxin, Natural bioactive compounds.

Abstract Id: PCO/PP/28

RECENT ADVANCES IN AUTOPHAGY AND CANCER

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Abstract

Autophagy is a cellular process responsible for degrading and recycling damaged or unnecessary components to maintain internal balance and support cell survival during stress condition. But in the case of cancer autophagy acting as a "double-edged sword," autophagy can both suppress tumor initiation by eliminating defective organelles and proteins and, conversely, promote tumor progression by enabling malignant cells to survive under metabolic and therapeutic pressure. Autophagy highly coordinated process in which initiation, nucleation, vesicles elongation, and fusion and degradation and regulated by a complex network/cascade of signalling pathways, including mTOR, AMPK, PI3K/AKT, MAPK/ERK, and p53. These signalling pathways stimulates or inhibit the autophagy at molecular level according to cellular conditions such as nutrient levels, oxidative stress, and DNA damage. Autophagy has dual nature phase in cancer such as tumor-suppressive phase in which it removes damaged mitochondria and misfolded proteins, thereby reducing oxidative stress, preserving genomic stability, and minimizing chronic inflammation and during the tumorpromoting phase, autophagy supports cancer cell survival under harsh conditions such as hypoxia, nutrient deficiency and acidosis and recycles intracellular materials into essential metabolites for the growth of the cancer cell. Autophagy in cancer condition targeted therapy such as Synthetic autophagy modulators are Lysosomal inhibitors, ULK-1 / 2 inhibitors, VPS-34 inhibitors and Lysosomal protease and VATPase inhibitors and Plant derived autophagy modulators. Based on the recent therapeutic innovations in which including vertical inhibition strategies, combination of two drugs that block multiple steps of the autophagy pathway, preventing tumor cells Such combination approaches integrated with chemotherapy, radiotherapy, or immunotherapy.

Keywords Double-edged sword, Signalling pathways, Chemotherapy, Radiotherapy, or Immunotherapy

Abstract Id: PCO/PP/29

Therapeutic Targets in Auto-inflammatory Diseases

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Abstract

Autoinflammatory diseases are a group of disorders caused by abnormal activation of the innate immune system, which causes recurring episodes of systemic inflammation in the absence of autoantibodies or antigen-specific T cells. Familial Mediterranean Fever (FMF), CryopyrinAssociated Periodic Syndrome (CAPS), Still's disease, and Behcet's

disease are examples of common auto-inflammatory illnesses. These diseases are associated with excessive production of pro-inflammatory cytokines such as interleukin-1 (IL-1), interleukin-6 (IL-6), interleukin-18, tumor necrosis factor-alpha (TNF- α), and interferons (IFNs). Therefore, therapeutic strategies target these cytokines and their signaling pathways to control inflammation and prevent tissue damage. Interleukin-1 plays a central role and drugs like Anakinara, canakinumab, and rilonacept have proven highly effective in IL-1 driven conditions. IL-6 inhibitors like tocilizumab, IL-18 inhibitors such as Tadekinig alfa and IFN blockers are Baricitinib, Ruxolitinib are used in selected autoinflammatory diseases. Novel approaches also focus on inhibiting the NLRP3 inflammasome using molecules such as MCC950, OLT1177 and Tranilast to directly block inflammation at its source. These targeted therapies have revolutionized treatment, improving quality of life and reducing tissue damage.

Keywords: Auto-inflammatory diseases, Innate immunity, Cytokines, Interleukin-1, Interleukin6, Interleukin-18, Type-1 interferons, NLRP3 inflammasome, MCC950, OLT1177, Anakinra, Canakinumab, Tadekinig alfa, Baricitinib, Tranilast.

Abstract Id: PCO/PP/30

Molecular Interplay Between Neuroinflammation and Neuronal Degeneration: Emerging Mechanistic Insights

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Abstract
Neuroinflammation orchestrates a complex molecular interplay between neuronal damage and glial activation, which is crucial for the development and progression of neurodegenerative diseases. Oxidative stress, mitochondrial malfunction, and synaptic damage are caused by pro-inflammatory cytokines, chemokines, and reactive oxygen species released by activated microglia and astrocytes. Important signalling cascades that increase neuroinflammatory responses, including NLRP3 inflammasome pathways, MAPK, and NF-κB, cause protein misfolding and neuronal death. A self-reinforcing cycle of degeneration is created when pro- and anti-inflammatory mediators are out of balance, which intensifies neurotoxicity. Moreover, emerging evidence indicates that crosstalk between neuroimmune cells and neurons modulates autophagy, protein clearance mechanisms, and blood–brain barrier integrity, thereby influencing disease trajectory. Recent mechanistic insights into these interrelated molecular events are examined in this review, along with possible treatment approaches meant to modulate neuroinflammatory signalling. It might be easier to create focused treatments for Parkinson's, Alzheimer's, and other neurodegenerative illnesses if these pathways are better understood.

Keywords: Neuroinflammation, Microglia, Astrocytes, NF-κB, NLRP3 inflammasome, Oxidative stress, Mitochondrial dysfunction, Neurodegeneration, Cytokines, Therapeutic targets.

Abstract Id: PCO/PP/31

Drug Delivery Combination Therapy Strategies for Overcoming Drug Resistant.

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Abstract

Drug delivery is the process of administering a pharmaceutical compound to achieve a therapeutic effect in humans or animals .The rise of drug resistance in cancer cells presents a formidable challenge in modern oncology, necessitating the exploration of innovative therapeutic strategies. This review investigates the latest advancements in overcoming drug resistance mechanisms employed by cancer cells, focusing on emerging therapeutic modalities. The intricate molecular insights into drug resistance, including genetic mutations, efflux pumps, altered signalling pathways, and micro environmental influences, are discussed Furthermore, the promising avenues offered by targeted therapies, combination treatments, immunotherapies. To achieve a desired pharmacological response at a selected sites without undesirable interaction at other sites, there by the drug have a specific action with minimum side effects and better therapeutic index. Keyword:- Therapeutic effect, Side effect, Therapeutic index

Abstract Id: PCO/PP/32

The Role of Toxins and Pollutants in Alzheimer's Disease

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Abstract

Air pollution represents a serious health threat globally, particularly regarding systemic and neurological effects, the evidence demonstrates that exposure to environmental toxins (fine particulate matter [PM2.5, PM10], nitrogen dioxide, sulfur dioxide, heavy metals [lead, mercury], and volatile organic compounds) promotes key pathological mechanisms of AD, including oxidative stress, neuroinflammation, and protein aggregation. Commonly cited in these instances are epidemiological studies where people living in areas where air quality for PM2.5 exceeds the WHO air quality criteria (for example, the Indo-Gangetic Plain of South Asia) are exposed to increased risk for neurological decline. While raising PM2.5 levels are apparent in many urban centers, such as Kanpur, Kolkata, and surrounding cities, due to industrial emissions and waste disposal, given that air quality in many Indian cities (e.g., Delhi, Kanpur, Lucknow, Kolkata) significantly exceeds WHO criteria, the overlap between environmental health and public health necessitates urgent discussion. Beyond environmental exposures, AD risk is often a four-way interplay of genetic predisposition (such as APP, PSEN1, and PSEN2 mutations, and the APOE ε4 allele), lifestyle (for example, stress, lack of sleep, and low to moderate physical activity), and socio-ecological factors. With respect to early diagnosis, biomarkers and advances in imaging technology have improved early detection, and potential treatments are increasingly focused on disease- modifying approaches, rather than symptomatic ones. Monoclonal antibodies, multifunctional small molecules, phytopharmaceuticals, and delivery frameworks reliant on nanotechnology are new opportunities, while prevention through Mediterranean dietary approaches, AYUSH therapies, and green infrastructure policies highlight the need for holistic approaches. Addressing the forever-increasing burden of AD will require a multifaceted approach that looks to coordinate regulatory science with biomedical innovations, behavioural change, and access to equitable health care. Interdisciplinary approaches are needed to contend with the implications of AD in populations exposed to pollution (within, among other, the Indo-Gangetic Plain, and West Bengal region) as well as across the rest of the world.

Keywords: Alzheimer's disease (AD); Air pollution; Particulate matter; Neuroinflammation; Oxidative stress; Amyloid precursor protein; Presenilin (PSEN1,PSEN2); Apolipoprotein.

Abstract Id: PCO/PP/33

Explicit analysis of in vivo, meteorological, and statistical hurdles in successful clinical translation of targeted nanomedicines and plausible remedial strategies

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Abstract

Introduction: The potential of nanomedicine in alleviating different disorders is immense, but its clinical translation rate is severely debilitated, despite promising preclinical study outcomes. For therapeutically successful targeted delivery of nanomedicines, it is crucial to understand why well-designed nanomedicines often fail during clinical trials.

Areas covered: This review comprehensively explores the multifactorial reasons behind the poor clinical success rate of nanomedicines, including pathophysiological complexity, limitations in statistical analysis, inadequate animal models, variability in the EPR effect, and manufacturing challenges. Special focus is placed on the misinterpretation and misuse of statistical tools in preclinical studies, which significantly reduces data interpretation and clinical predictability. The review is based on an in-depth literature survey of recent advances and failures in nanomedicine translation, with an emphasis on incorporating simulation models and synthesized data to overcome the challenges of statistics.

Expert opinion: Addressing translational gaps requires a multidisciplinary approach, refined preclinical models, robust statistical frameworks, and adaptive clinical designs that are essential. Innovative tools, such as CTGAN and personalized trial strategies, can bridge the preclinical-clinical divide. To realize the full potential of nanomedicine, it is crucial to resolve foundational issues in experimental design, data interpretation, analytical frameworks, and regulatory compliance.

Keywords: Clinical translation; enhanced permeation and retention; Nanomedicine; Pre-clinical studies; Pathophysiology; statistical analysis

Abstract Id: PCO/PP/34

A comprehensive study on Gene therapy: A Novel Treatment Approach From Strategy to Target

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Abstract

Gene therapy is an attractive approach for disease treatment. Platelets may be a special target for gene treatment of illnesses since they are plentiful blood cells with unique storage and distribution capacities as well as essential functions in immunity and hemostasis. Recent studies have demonstrated that ectopic expression of factor VIII (FVIII) in platelets under control of the platelet-specific promoter results in FVIII storage together with its carrier protein von Willebrand factor (VWF) in α-granules and the phenotypic correction of hemophilia A. Crucially, even in the presence of functional-blocking inhibitory antibodies, the storage and sequestration of FVIII in platelets seems to successfully reestablish hemostasis. Studies on platelet-specific gene therapy for hemophilia A are compiled in this review. Our goal was to learn what clinicians thought about gene therapy as a viable treatment for Alzheimer's disease (AD) in the future, as well as any potential obstacles or enablers.

Keywords: Hemophilia, Gene therapy, Parkinson’s Disease, Alzhemer’s Disease.

Abstract Id: PCO/PP/35

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Formulation approaches for Cancer immunotherapies targeting PD-1, PD-L1 and CTLA-4 checkpoints signaling pathways

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Objective
Using the immune system to target and destroy tumor cells, cancer immunotherapy has completely changed the way cancer is treated. The cytotoxic T-lymphocyte-associated protein 4 (CTLA-4) checkpoint signaling pathway, programmed cell death protein 1 (PD-1), and programmed death-ligand 1 (PD-L1) are important targets in this strategy. In this review we focus on checkpoint signaling pathways and formulation strategies to enhance the therapeutic effect.
Significance
The effective inhibition of these checkpoints is to maximize therapeutic efficacy while reducing off-target effects and enhancing patient tolerability.
Methods
Clinically, monoclonal antibodies such as ipilimumab (anti-CTLA-4), atezolizumab and durvalumab (anti-PD-L1), and pembrolizumab and nivolumab (anti-PD-1) have been developed to block immune checkpoints and enhance anti-tumor T-cell activity. By obstructing the interaction between checkpoint molecules and their ligands, these monoclonal antibodies (mAbs) prevent T-cell activation from being inhibited and enhance anti-tumor immune responses.
Results
To maximize the immunotherapies, pharmacokinetic and pharmacodynamic qualities, a number of formulation techniques have been used. To increase half-life and improve tumor penetration, they include Fc engineering, pegylation, and albumin binding. In addition, to increase target selectivity and lower systemic toxicity, innovative drug delivery technologies such liposomes, nanoparticles, and antibody-drug conjugates (ADCs) have been investigated.
Conclusion
Formulation strategies for cancer immunotherapies that target the signaling pathways of PD-1, PD-L1, and CTLA-4 checkpoints show promise for enhancing the effectiveness and safety of cancer treatment.

Keywords: Cancer; Immunotherapy; signaling pathway; checkpoint inhibitors; monoclonal antibodies; Nanoparticles

Abstract Id: PCO/PP/36

Angiogenesis and Lymphangiogenesis: Dual process in wound healing

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Abstract
Angiogenesis and lymphangiogenesis play critical role in wound healing. Newly formed blood vessels participate in provisional granulation tissue formation and provide nutrition and oxygen to growing tissues. lymphatic system maintains a fluid balance in the body and tissue homeostasis; it drains protein-rich lymph from the interstitial space and facilitates the release of cells that mediate the immune response When one tissue is damaged, more cells and tissues work to repair the damaged site. Blood and lymph vessels are particularly important for tissue regeneration and healing. Angiogenesis is the process of the formation of new blood vessels and is induced by angiogenic factors such as VEGF-A; and VEGF-C/D-induced lymphangiogenesis and both occur simultaneously during wound healing. After the inflammatory phase, lymphatic vessels suppress inflammation by aiding in the drainage of inflammatory

mediators; thus, disorders of the lymphatic system often result in chronic and disabling conditions. It has recently been clarified that delayed wound healing, as in diabetes, can occur as a consequence of impaired lymphangiogenesis. In this review, we have highlighted mechanisms and factors associated with angiogenesis and lymphangiogenesis in wound healing and the possibility of its pharmacological modulation as a novel therapeutic strategy for the treatment of chronic wounds.

Keywords: Angiogenesis, lymphangiogenesis, wound healing, VEGF-A, VEGF-C, VEGF-D

Abstract Id: PCO/PP-37

Lifestyle Modifications in Diabetes

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Living with diabetes means your body struggles to manage blood sugar, but it doesn't have to define your life. Think of lifestyle changes not as a restrictive treatment, but as a powerful, everyday way to take back control of your health. This approach is especially powerful for Type 2 diabetes, where the choices we make about how we live can fundamentally reshape our well-being. The goal Is simple: to help your body maintain healthy blood sugar levels, make better use of its own insulin, and protect you from future complications. This journey is built on a foundation of nourishing foods—think colorful vegetables, hearty whole grains, and lean proteins—paired with movement you enjoy. Reaching a healthy weight becomes a natural side effect of these positive habits, not just a number on a scale. It's also about caring for your mind, as managing stress is just as crucial as managing your diet. Small, sustainable steps make all the difference. Cutting back on alcohol and quitting smoking aren't just recommendations; they are profound gifts to your heart and overall health. The evidence is clear and hopeful: by embracing these changes, many people at risk can prevent diabetes altogether, and those already diagnosed can often reduce their reliance on medication. Ultimately, this isn't about a short-term diet or a temporary fix. It's about being equipped with the right knowledge, feeling supported in your journey, and building a sustainable, healthier life that you can enjoy for years to come. You are the most important person in your care team, and these lifestyle changes are your most powerful tools.

Keywords:* diabetes, blood-sugar, lifestyle, nutrition, exercise, weight, stress, alcohol, smoking, cardiovascular, prevention, self-care, insulin sensitivity, glucose control, chronic disease.

Abstract Id:PCO/PP-38

Impact of Bisphenol A on hippocampal function: Mechanism of Oxidative stress and Neuronal apoptosis

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Abstract

Bisphenol A, an endocrine disruptor linked to cognitive deficits and neuronal disturbances but used widely in everyday products. BPA exposure leads to oxidative stress and also activates apoptotic pathways in hippocampal neuron which is essential for memory and leaning. This review is based on current finding to show how BPA induces neurotoxicity. Recent studies shows that BPA elevate the level of reactive oxygen species, disrupt mitochondrial function, weakens antioxidant defence mechanism and trigger apoptosis through caspase activation. These molecular processes contribute to functional impairments and are closely linked to neuroinflammation and neuronal damage. The integrated mechanistic approach shows oxidative stress as a main trigger of hippocampal apoptosis due to BPA exposure. Comprehending these pathways shows the importance of reducing BPA exposure and offers the basis for

developing potential neuroprotective interventions. Keywords: Bisphenol A, Hippocampus, Oxidative stress, Neurotoxicity, Neuronal damage, Apoptosis

Abstract Id:PCO/PP-39

"Hepatoprotective Effects of Natural Antioxidants Against Cyclophosphamide-Induced Liver Injury"

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Abstract

Cyclophosphamide (CPA) is a well-known chemotherapeutic drug and also known for its clinical use as immunosuppressive but it can also cause dose-dependent hepatotoxicity. During the CPA metabolism in liver, it produces reactive metabolites like acrolein that leads to generation of reactive oxygen species (ROS) and causes liver cell injury. The produced free radicals cause the imbalance and oxidative stress, lipid peroxidation, also reduce the natural antioxidant levels, which results in liver cell injury. Recent studies showed the ability of natural antioxidants derived from dietary and plant sources to fight against drug-induced liver toxicity. Many compounds like silymarin, curcumin, quercetin and resveratrol have shown good hepatoprotective effects by boosting activity of antioxidant enzyme, regulating inflammatory pathways and clearing the free radicals. These compounds help the liver to keep up with chemotherapy and get the benefits of CPA safely without much risk. This review shows the pathways of hepatoprotection with these natural agents from cyclophosphamide-induce hepatotoxicity. The understanding of these protective pathways is essential to develop safer therapies and get better outcome with less liver damage even during chemotherapy.

Keywords: Hepatoprotection, Cyclophosphamide, Liver toxicity, Antioxidant, Oxidative stress

Abstract Id:PCO/PP-40

Impact of STZ-Induced Diabetes on Cardiac Oxidative Stress and the Protective Role of Antioxidants

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Abstract

Diabetes mellitus is a serious metabolic disease that is associated with cardiovascular problems brought on by oxidative stress and chronic hyperglycemia. STZ-induced diabetes is a well-known experimental paradigm that replicates the pathophysiology of type-1 diabetes. Long-term hyperglycaemia causes excessive generation of reactive oxygen species (ROS) which results in lipid peroxidation, mitochondrial malfunction, and cardiac myocytes disruption. This review is based on the evaluation of cardioprotective capability of natural and synthetic antioxidants and highlights the mechanistic insights into STZ-induced cardiac oxidative stress. Antioxidants like quercetin, resveratrol, curcumin, and N-acetylcysteine are studied that shows that they can effectively reduce oxidative stress by reducing the inflammatory cytokines and restoring endogenous antioxidant enzyme activity (SOD, catalase, GSH). The collected data suggests that regulation of oxidative stress is essential for preventing diabetic cardiomyopathy. Novel therapeutic agents or strategies can be developed by understanding these mechanisms may that can protect the heart from diabetes-induced oxidative damage and improve clinical outcomes in diabetic patients.

Keywords: Streptozotocin, Diabetes, Oxidative Stress, Cardiomyopathy, Antioxidants,
Cardio protection.

Abstract Id:PCO/PP-41

Protective Role of Polyphenolic Compounds in Scopolamine-Induced Cognitive Decline

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Abstract

Cognitive impairment in neurodegenerative diseases like Alzheimer is linked to oxidative stress, cholinergic system dysfunction and neuroinflammation. Scopolamine is widely used in research to mimic memory decline by blocking muscarinic acetylcholine receptor causing brain changes resembling the pathology Alzheimer disease. This model shows classic features like increased oxidative stress and acetylcholinesterase activity and neuronal degeneration in hippocampus and cortex regions of brain.

Lately, plant-based polyphenols like curcumin, epigallocatechin (EGCG), quercetin and resveratrol have shown their neuroprotective and nootropic activity against cognitive decline. These agents have been studied for their ability to protect the brain by scavenging free radicals, calming inflammatory mediators, inhibiting acetylcholine activity and supporting synaptic plasticity. Polyphenols show promising hope for preventing cognitive problems linked to neurodegeneration by reducing damage and improving nerve cell communication. This review helps in highlighting the preventive mechanism of polyphenols in scopolamine induced oxidative and cognitive impairments. The therapeutic potential of polyphenol-rich intervention as multi-target tactics for postponing and preventing cognitive impairment in neurodegenerative diseases.

Keywords: Scopolamine, Polyphenols, Neuroprotection, Antioxidants, Cognitive Decline, Nootropics, Alzheimer's Disease

Abstract Id:PCO/PP-42

"Role of Nitric Oxide and Endothelial Dysfunction in Cardiovascular Diseases"

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Abstract

Cardiovascular diseases (CVDs) remain a leading cause of morbidity and mortality worldwide. Endothelial dysfunction is an early and critical event in the development of CVDs, characterized by impaired vascular homeostasis and reduced vasodilatory capacity. Nitric oxide (NO), an endothelium-derived signalling molecule, plays a central role in regulating vascular tone, inhibiting platelet aggregation, and modulating inflammation. Reduced bioavailability of NO, due to oxidative stress, inflammation, or cardiovascular risk factors such as hypertension, diabetes, and dyslipidaemia, contributes significantly to endothelial dysfunction. This dysfunction promotes atherosclerosis, hypertension, myocardial infarction, and heart failure. Therapeutic strategies targeting NO pathways, including lifestyle modifications, pharmacological agents like statins, ACE inhibitors, and NO donors, aim to restore endothelial function and improve cardiovascular outcomes. Understanding the interplay between nitric oxide and endothelial dysfunction is crucial for developing preventive and therapeutic approaches to manage cardiovascular diseases effectively.

Keywords: Nitric oxide, endothelial dysfunction, cardiovascular disease, vasodilation, oxidative stress

Abstract Id:PCO/PP-43

Pharmacological and Toxicological Perspectives of Nanocarrier-Based Drug Delivery Systems: Balancing Efficacy and Safety

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Abstract

Nanocarrier-based drug delivery systems have revolutionized modern pharmacotherapy by enhancing the bioavailability, stability, and target specificity of therapeutic agents. These nanoscale vehicles — including liposomes, polymeric nanoparticles, dendrimers, and metallic nanocarriers — offer promising strategies for controlled drug release and reduced systemic toxicity. However, while their pharmacological advantages are well-documented, their toxicological implications remain an emerging concern. Unintended biodistribution, oxidative stress, immunogenicity, and organ-specific accumulation may pose significant safety challenges. This review critically explores the dual dimensions of nanocarrier-based drug systems: their pharmacological mechanisms of improved drug delivery and therapeutic outcomes, and the toxicological risks associated with their physicochemical properties, degradation products, and long-term exposure. Furthermore, the paper discusses recent advances in predictive toxicology models, in vitro and in vivo testing approaches, and regulatory perspectives aimed at ensuring the safe translation of nanomedicines from bench to bedside. Understanding this balance between pharmacological potential and toxicological risk is essential for the rational design of next-generation nanotherapeutics.

Keywords: Nanocarriers, Drug delivery, Pharmacology, Toxicology, Safety assessment, Nanotoxicology, Targeted therapy

Abstract Id:PCO/PP-44

MODULATION OF CELL CYCLE FOR THE MANAGEMENT OF NEUROLOGICAL DISORDER: A THEREPEUTIC APPROACH

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ABSTRACT

Regardless of considerable research, efficient therapeutic treatments for major neurological disorders like Alzheimer's Disease (AD), Parkinson's Disease (PD), and epilepsy, remain incomprehensible. This knowledge gap is partially due to the intricate and diverse characteristics of their underlying pathophysiology. A growing body of evidence indicates that aberrant cell cycle re-entry, or cell cycle dysregulation by inappropriate activation of cell cycle regulators like CDKs plays a major role in the pathogenesis of neurodegeneration. Due to these being an integral part of neurodegeneration's pathophysiology modulation of cell cycle become apparent as a promising therapeutic approach. This review analyses the potential of different approaches aimed at cell cycle arrest or modulation like pharmacological interventions using CDK inhibitors, modulation of checkpoint regulators, or by reprogramming transcription of cell cycle genes using gene therapy that have shown neuroprotective effects in pre-clinical, models delaying neuronal loss and disease progression. Despite promising results challenges remains regarding Blood-brain barrier permeability, and long-term safety. Moreover, regenerative approaches based on cells, like stem cell therapies seek to combat cellular senescence and rejuvenate normal neuronal function by affecting cell cycle dynamics. Continued research is needed to provide deeper insight to integrating cell cycle modulators with disease specific intervention and biomarker- based personalized therapy and translate these clinical findings into therapeutic benefit. With our growing comprehension of cell cycle dysregulation in neurodegeneration, focused adjustments to this pathway present substantial promise as a new disease-modifying strategy, necessitating expedited clinical research.

Abstract Id:PCO/PP-45

Eradication of superficial fungal infections by conventional and novel approaches

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Abstract

During the last two decades, the occurrence of fungal infections either superficial or systemic has been increasing. Moreover, fungal infections become more difficult to treat when they show coupling with immunogenic diseases like AIDS. Superficial fungal infections are associated with skin, nail and eye and are less prominent to systemic infection. However, it may be dangerous if not treated properly. It is usually observed that conventional formulations including cream, powder, gels etc. are used to treat skin fungal infections even for the deep seated fungal infections.

However, these formulations show various side-effects on the application site like burning, redness and swelling. Further, due to the immediate release of drug from these formulations they can stimulate the immune system of body generating high impact allergic reactions. Deep seated fungal infections like invasive aspergillosis and invasive candidiasis may be more difficult to treat because the drug released from conventional topical formulation can not reach at the target site due to the low penetration capacity. Similarly, in case of fungal infection of nail and eye, conventional formulations show problem of less bioavailability. Thus, to overcome the drawbacks of conventional therapy a lot of research works have been carried out to develop novel formulations of antifungal drugs to deliver them superficially. Novel formulations explored for the skin delivery of antifungal drugs include liposomes, niosomes, ethosomes, microemulsions, nanoparticles, microspheres and micelles. These formulations show extended or sustained release of drug, minimizing the side effect on application site, enhancing bioavailability and reducing the dosing frequency.

Further, these formulations also show penetration into the deep skin to treat invasive fungal infections. Novel formulations explored in treatment of fungal infections of eye are liposomes and nanoparticles and whether for nail fungal infections microemulsions are the choice. In present article, we have discussed about conventional treatment of superficial fungal infection and their comparison with the novel drug delivery systems.

Keywords: fungal infection, liposomes, novel drug delivery, topical delivery.

Abstract Id:PCO/PP-46

Exploring Pharmacological and Toxicological Perspectives in the Management of Uterine Fibroids: A Pathway Toward Safer Therapeutics

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Abstract

Uterine fibroids (leiomyomas) are benign smooth muscle neoplasms of the uterus that affect up to 70% of women of reproductive age, leading to menorrhagia, pelvic discomfort, infertility, and considerable deterioration in quality of life. Current pharmacological interventions, including gonadotropin-releasing hormone (GnRH) agonists and selective progesterone receptor modulators, offer only transient symptom relief and are often limited by adverse effects and post-treatment recurrence. These challenges underscore the pressing need for safer, long-term pharmacotherapeutic strategies.

This study investigates the pharmacological and toxicological mechanisms underpinning fibroid pathogenesis, with particular emphasis on estrogen–progesterone disequilibrium, oxidative stress, inflammation, extracellular matrix

dysregulation, and aberrant activation of signalling cascades such as TGF-β, MAPK, and PI3K/Akt. By integrating mechanistic pharmacology with toxicological profiling, the research aims to identify and evaluate novel anti-fibrotic and anti-estrogenic compounds that minimize systemic toxicity while maintaining therapeutic potency.
Experimental studies employing rodent models, together with biochemical, molecular, and histopathological analyses, will elucidate the efficacy and safety profiles of potential lead molecules capable of modulating fibrogenic pathways without disrupting normal uterine physiology. The anticipated findings are expected to advance current understanding of uterine fibroid pharmacodynamics and foster the rational design of safer, targeted pharmacotherapies that effectively bridge the gap between efficacy and safety in fibroid management.

Keywords- Uterine fibroids, Imbalance, Oxidative Stress, Inflammation, Targeted Therapy, Signal Transduction, Safer Therapeutics

Abstract Id:PCO/PP-47

NEUROINFLAMMATION IN DEPRESSION AND ITS PHARMACOLOGY MODULATION

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ABSTRACT
Neuroinflammation is significantly implicated in the pathogenesis and depressive disorder. Heightened systemic inflammation correlates with diminished antidepressant response and unfavorable prognoses. Novel anti-inflammatory interventions may benefit individuals with depression and immune dysregulation. Employing inflammatory markers can aid in identifying patients exhibiting inflammation and potential resistance to conventional therapies, thereby facilitating optimized treatment strategies. This review elucidates
the influence of neuroinflammation on major depressive disorder and proposes alternative inflammation- targeted treatments, such as electroconvulsive therapy and ketamine. It also examines the utility of inflammatory markers in mitigating treatment resistance and refining therapeutic approaches.
Neuroinflammation encompasses non-neuronal cells that can compromise nerve function, precipitating depressive symptomatology. The concept of induced inflammation in animal models has spurred inquiries into the activation mechanisms of immune cells within the brain. Contemporary research indicates microglia activation in depression, yet the clinical implications remain ambiguous. The processes underlying brain inflammation associated with depression. This mini-review will address recent discoveries regarding neuroinflammatory mechanisms in experimental depression models, the complexities of replicating depression in laboratory animals, and the therapeutic potential of targeting neuroinflammation for depressive
disorders.

Keywords: Depression, Neuroinflammation, Cytokines, Immune cells, Experimental models and Microglia.

Abstract Id:PCO/PP-48

Protective potential of green apple–derived polyphenols against nicotine/e-cigarette–induced in mice.

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Abstract
Electronic cigarettes (e-cigs) deliver nicotine and flavor-ants that produce oxidative stress and inflammation in murine lung models. Apple-derived polyphenols (particularly from green apples) have antioxidant and anti-inflammatory potential. This review synthesizes available preclinical data on apple extract effects in nicotine or e-cigarette–induced

models, identifying mechanistic pathways and proposing an experimental framework. Literature shows that e-cig exposure induces lung injury and neuroadaptation, whereas apple polyphenols attenuate smoke-induced oxidative stress and inflammation. Green apple flavor-ants (farnesene) may modify nicotine reward, representing a confounding factor. Further studies combining inhalational nicotine models and oral apple extract supplementation are warranted to clarify therapeutic potential. Polyphenols reduces microglial M1 polarization ,TNF/MAPK signaling and boosting antioxidant defenses that enhance cognition while lowering apoptosis and oxidative markers. Urosolic acid provides neuroprotection by activating Nrf2 and the downstream HO-1/NQO1 pathways. This process decreases inflammatory mediators and lipid per oxidation, but its benefit disappears in mice lacking Nrf2, highlighting a crucial redox mechanism.

Keywords: Nicotine ,E-cigarettes, chlorogenic acid, farnesene, urosolic acid, microglial polarisation ,oxidative markers.

Abstract Id:PCO/PP-49

Antimicrobial resistance of Carbapenens and cephalosporins on Gram negative bacteria: A wayout approach

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Abstract:
The escalating crisis of antimicrobial resistarice (AMRI necessitates a judicious approach to utilizing broad spectrum -lactam antibiotics, namely carbapenems and cephalosporins. Both drug classes are crucial for treating severe bacterial infections, acting by inhibiting bacterial cell wail synthesis via interaction with penicillin-binding proteins (PBPS). Cephalosporins offer a diverse range of activity across five generations, but their efficacy is increasingly compromised by -lactamases, such as ESBLS. In contrast, carbapenems (e.g., meropenem) boast an ultra broad spectrum and exhibit superior stability against many Blactamases, positioning them as essential last line agents. However, this advantage is being rapidly. eroded by the global spread of carbapenemase enzymes (eg., KPC, NOM), creating critically resistant strains (CRE). This poster provides a comparative analysis of the distinct mechanisms, spectra, and contemporary resistance profiles of carbapenems and cephalosporins. Data on current resistance trends for key Gram-negative pathogens will highlight the erosion of both drug classes and underscore the urgent need for stringont antibiotic stewardship and the development of effective B-lactamase inhibitors to preserve these foundational antibacterial agents, also The choice between a cephalosporin and a carbapenem requires a meticulous assessment of the infection site, local resistance epidemiology, and the specific patient risk factors. While cephalosporins remain vital for many less complicated and targeted infections, the rise of MDR organisms means carbapenems are often irreplaceable. The future efficacy of both classes, especially carbapenems, is heavily dependent on Implementing rigorous Antimicrobial Stewardship (AMS) programs, rapid diagnostics to guide therapy, and the continued development of novel beta-lactam,beta-lactamase inhibitor combinations leg, ceftazidime-avibactam, meropenem-vaborbactami to counteract the evolving enzymatic resistance threats

Keywords: carbapenems, cephalosporins, Beta lactam Aritibiotics, Beta lactamase, Antibacterial resistance, gram negative bacteria.

Abstract Id:PCO/PP-50

Brain-on-a-Chip: A Novel Platform for Modeling Alzheimer's Disease and Accelerating Drug Screening

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Abstract

The Brain-on-a-Chip platform represents a significant advancement in the field of neurodegenerative disease modeling and drug discovery for Alzheimer's disease. This innovative microfluidic system faithfully replicates the tissue architecture and cell-to-cell interactions found in the human brain by integrating neurons, astrocytes, and microglia, thereby providing a more physiologically relevant environment than traditional in vitro or animal models. The fabrication process uses specialized chip designs to allow precise spatial organization and compartmentalization, enabling the co-culture and dynamic interaction of multiple brain cell types. Through this technology, key pathological features of Alzheimer's, such as amyloid-beta plaque deposition and neuronal degeneration, can be replicated and studied in real-time. The platform's stepwise methodology includes chip fabrication, seeding of human-derived cells, sustained culture under controlled microfluidic flow, and detailed monitoring using advanced imaging and analytical tools. This setup allows for continuous observation of disease progression and cellular responses. Uniquely, the Brain-on-a-Chip system is amenable to the introduction of candidate drugs or therapeutic agents, facilitating high-throughput screening and toxicological assessment directly within the engineered microenvironment. The enhanced predictive power, scalability, and ability to incorporate patient-specific cells open new avenues for personalized medicine and more effective drug development. By bridging the gap between in vitro experiments and human clinical trials, this technology accelerates the identification and optimization of novel therapeutics for Alzheimer's disease, ultimately improving prospects for clinical translation and patient care.

Keywords: Brain-on-a-Chip, Alzheimer's disease, Drug screening, Microfluidics, 3D cell culture, Neurodegeneration, Amyloid-beta, Biomarkers, Personalized medicine

Abstract Id:PCO/PP-51

PPAR-γ Agonist Exhibits Therapeutic Potential in Mitigating Metabolic Stress-Associated Alzheimer's Disease via Modulation of Adiponectin Signaling in the Brain

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Abstract

Background: Alzheimer's disease (AD) is progressively acknowledged as a metabolic condition characterised by compromised insulin signalling, mitochondrial dysfunction, and neuroinflammation. PPAR-γ is crucial in modulating lipid metabolism and neuroinflammatory responses, with its dysregulation implicated in the aetiology of AD. Adiponectin, an adipokine with anti-inflammatory and insulin-sensitizing characteristics, demonstrates neuroprotective effects within the brain. Chronic metabolic stress diminishes adiponectin signalling, intensifying neuronal damage. Targeting PPAR-γ pathways to reinstate adiponectin activity may provide an innovative treatment strategy to alleviate metabolic stress-related Alzheimer's pathogenesis. Method: Male Wistar rats were subjected to a high-fat diet (60% energy from fat) for 12 weeks and administered lipopolysaccharide (250 µg/kg, i.p.) for one week to induce metabolic stress–linked AD pathology. The 16-week study included six groups (n = 6 each) maintained under controlled conditions. Results: The histological examination of the hypothalamus and cerebral cortex revealed elevated tau phosphorylation and amyloid beta deposition. Additionally, there was a decrease in insulin resistance as seen by the HOMA-IR measurement and increase in adiponectin expression as compared to disease. The innovative object recognition test, which measures behaviour, also confirmed the findings. The rats exhibited a marked decline in discriminating index and other cognitive abilities. Conclusion: These findings suggest that modulation of PPAR-γ activity alleviates neurodegenerative alterations associated with metabolic stress by restoring adiponectin signaling and neuronal insulin sensitivity. Targeting the PPAR-γ–adiponectin axis thus holds promising therapeutic potential for managing metabolic stress–associated AD.

Keywords: Alzheimer's disease, Metabolic syndrome, PPAR-γ, Adiponectin.

Abstract Id:PCO/PP-52

Prodrug Design Strategies to Improve Bioavailability and Target Specificity

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Abstract

Prodrug design is a strategic approach in modern drug development aimed at overcoming the limitations of active pharmaceutical compounds, particularly poor bioavailability, low solubility, instability, and lack of target specificity. A prodrug is an inactive or less active derivative of a parent drug that undergoes enzymatic or chemical transformation within the body to release the active therapeutic agent at the desired site of action. This approach enhances pharmacokinetic and pharmacodynamic properties without altering the drug's intrinsic activity. Prodrug design strategies focus on improving oral absorption, membrane permeability, targeted delivery, and minimizing adverse effects. Techniques such as carrier-linked prodrugs, bioprecursor prodrugs, and site-specific enzymatic activation are commonly employed to achieve controlled activation. Advanced computational tools and molecular modeling have further enabled rational design and prediction of optimal prodrug candidates. Notable examples include valacyclovir (enhanced oral bioavailability of acyclovir) and oseltamivir phosphate (improved stability and absorption). The integration of in silico design, nanocarrier systems, and enzyme-targeted linkers represents the next frontier in achieving precision therapy. In conclusion, prodrug design is a powerful and evolving concept that bridges chemistry and pharmacology to improve therapeutic efficacy, enhance patient compliance, and enable safer, more targeted drug delivery—paving the way for smarter medicines in the era of personalized healthcare.

Keywords: Prodrug**,** Bioavailability, Acyclovir

Abstract Id:PCO/PP-53

Cutting-Edge Regenerative and Gene Therapies with Emerging Drug Prospects in Osteoarthritis Impairments

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Abstract

Current management of osteoarthritis (OA) aims primarily to alleviate pain, optimize joint function, and improve quality of life, as no cure or definitive disease-modifying treatment exists. Standard therapies include nonpharmacological interventions such as exercise, physical and occupational therapy, and weight management, which are foundational across all disease stages. Pharmacological options comprise topical and oral nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen, and selected adjuncts like duloxetine or tramadol for persistent pain. Intra-articular therapies, including corticosteroids, hyaluronic acid, platelet-rich plasma, and mesenchymal stem cell injections, offer varied benefit in symptom relief and functional improvement. Regenerative modalities—such as autologous chondrocyte implantation, stem cell therapies, and biologic agents targeting inflammatory pathways (e.g., anti-NGF, anti-IL-1, or anti-TNF biologics)—represent emerging strategies under active investigation for their potential to promote tissue repair and modify disease progression. Surgical interventions like joint realignment (osteotomy) and total or partial joint arthroplasty are reserved for severe, refractory cases with significant structural damage. Recent and ongoing research in gene therapies, mitochondrial-protective peptides, and chondrogenic small molecules has demonstrated potential for advancing OA treatment, aiming to address underlying pathophysiological mechanisms and enable long-term functional joint preservation. The integration of regenerative medicine, advanced

biological therapies, and personalized approaches continues to expand OA treatment options, promising better outcome

Keywords: Gene, osteoarthritis, acetaminophen.

Abstract Id:PCO/PP-54

Molecular Insights and Translational Strategies in the Development of Novel Anti-Obesity Therapeutics

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ABSTRACT

Obesity is a multifactorial metabolic disorder characterized by excessive fat accumulation, chronic low-grade inflammation, and dysregulation of energy balance. Despite existing pharmacotherapies, long-term efficacy and safety remain major challenges, emphasizing the need for novel, mechanism-driven therapeutic strategies. This study focuses on elucidating key molecular regulators and signaling pathways that govern metabolic dysfunction in obesity and their potential as targets for next-generation drug development. Central metabolic enzymes and signaling cascades, including AMP-activated protein kinase (AMPK), acetyl-CoA carboxylase (ACC), and fatty acid synthase (FAS), were analyzed for their roles in lipid homeostasis. Activation of AMPK was observed to enhance lipid oxidation and energy utilization, while inhibition of ACC and FAS suppressed lipogenesis. Furthermore, modulation of inflammatory mediators such as NF-κB and NLRP3 inflammasome components demonstrated a strong link between metabolic regulation and inflammation control. Emerging evidence also highlights the importance of intestinal barrier integrity, with modulation of tight junction proteins contributing to improved metabolic signaling and reduced endotoxemia. These molecular and mechanistic insights collectively support the development of multi-targeted therapeutic approaches that address obesity through concurrent regulation of energy metabolism, inflammation, and gut homeostasis. Overall, this research establishes a strong foundation for the translation of molecular discoveries into innovative anti-obesity therapeutics with improved safety and efficacy profiles.

Abstract Id:PCO/PP-55

AI-powered Biomarker Discovery in Biopharmaceutical Research: Accelerating Personalized Medicine

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Abstract

The success of personalized medicine depends on our ability to quickly and accurately discover molecular biomarkers. Traditional biopharmaceutical research struggles with the vast and complex "multi-omics" data (which includes genomics, proteomics, and more). Artificial Intelligence (AI), using machine learning (ML) and deep learning (DL), offers a powerful solution to this challenge. AI-powered frameworks are exceptionally good at integrating these large and diverse datasets. This allows them to find hidden patterns and new biological markers that standard methods often miss. This capability is greatly accelerating biopharmaceutical R&D. It enables more precise patient grouping (stratification) for clinical trials and helps in developing new, highly targeted therapies. A key application is personalized drug repurposing —using AI to find new anti-cancer uses for existing, approved drugs by matching them to the specific patients who will benefit. Research on this topic is often spread across different fields. This work combines this scattered knowledge into a single, unified framework. It organizes the most important AI techniques, data sources, and biomarker discoveries. By bringing this information together, we show a clear path from research to patient care, highlighting how to solve key challenges and speed up the delivery of personalized medicine.

Keywords : Biomarker Discovery, Artificial Intelligence(AI), Personalized Medicine, Multi-omics, Drug Repurposing.

Abstract Id:PCO/PP-56

From Traditional to Intelligent: The Evolution of Clinical Trials in the AI Era

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ABSTRACT

Clinical trials are the mainstay of drug development. It ensuring the safety, efficacy, and quality of therapeutic products. The traditional clinical trials face challenges at different level as such prolonged timelines, high operational costs, data management errors, and difficulties in patient recruitment. The AI act as the catalyst in the evolution of clinical trials. The birth of Artificial Intelligence (AI) and digital technologies has revolutionized this process by enhancing efficiency, accuracy, and patient engagement. AI algorithms assist in identifying suitable participants, predicting trial outcomes, and detecting adverse events in real-time. Moreover, digital and decentralized clinical trials enable remote participation through wearable devices, mobile applications, and telemedicine, thereby improving accessibility and diversity. These advancements not only accelerate data collection and analysis but also reduce human error and cost burdens. Despite these benefits, challenges such as data privacy, regulatory acceptance, and infrastructure limitations remain. In the coming era the clinical research lies in adopting advanced tools for secure data management and digital twins for virtual patient simulations. The AI-driven clinical trials represent a transformative shift toward faster, smarter, and more patient-centric drug development.

Keywords: AI – (Artificial Intelligence), Catalyst.

Abstract Id:PCO/PP-57

Clinical Trials: The Scientific Pathway to Safe and Effective Medicines

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Abstract

Clinical trials represent the cornerstone of modern medical research, serving as the essential link between experimental discoveries and their translation into safe, effective therapeutic interventions. These trials are rigorously structured and methodically executed to evaluate the safety, efficacy, and overall benefit-risk profile of new drugs, vaccines, and medical devices in human populations. Conducted in sequential phases (I–IV), each stage serves a distinct scientific purpose—ranging from initial safety and dosage assessments to large-scale evaluations of therapeutic effectiveness and post-marketing surveillance for long-term safety outcomes. Adherence to ethical principles, including informed consent, participant confidentiality, and independent review, ensures the protection of human subjects and the integrity of study data. Randomization, blinding, and controlled methodologies are employed to minimize bias and enhance the reliability of results. Data derived from clinical trials form the evidentiary basis for regulatory approval and guide clinical decision-making across healthcare systems. Furthermore, ongoing post-approval monitoring provides crucial insights into real-world drug performance and rare adverse effects. By integrating ethical responsibility with scientific rigor, clinical trials not only advance pharmaceutical innovation but also uphold the principles of evidence-based medicine, ensuring that therapeutic interventions meet the highest standards of patient safety and clinical effectiveness.

Keywords: Clinical trials, Phases I–IV, Drug evaluation, Human studies, Safety, Efficacy, Ethics, Informed consent, Randomization, Evidence-based medicine.

Abstract Id:PCO/PP-58

Pharmacology and Toxicology: Two Sides of Drug Science

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Abstract

Pharmacology and toxicology are intimately connected scientific disciplines that investigate the interactions between chemical substances and biological systems. Pharmacology focuses on elucidating the mechanisms of drug action, their pharmacokinetic and pharmacodynamic properties, and their therapeutic applications in the prevention and treatment of diseases. Conversely, toxicology examines the deleterious, adverse, or lethal effects that arise when exposure to these substances exceeds physiological tolerance or therapeutic limits. Together, these fields constitute the scientific foundation of modern drug discovery, safety evaluation, and evidence-based clinical practice.

A comprehensive understanding of both the therapeutic and toxicological profiles of chemical agents is indispensable for the rational design, development, and safe administration of pharmaceuticals. By characterizing dose–response relationships, pharmacology and toxicology jointly define the boundary between efficacy and toxicity, thereby optimizing drug safety and therapeutic outcomes. Recent advancements in molecular pharmacology, toxicogenomic, and computational modelling have further deepened the integration of these disciplines, enabling the prediction of adverse drug reactions and the advancement of precision medicine. Moreover, toxicological research plays a pivotal role in environmental and occupational health, contributing to the establishment of regulatory frameworks that protect human populations and ecosystems. Collectively, pharmacology and toxicology continue to advance our understanding of chemical–biological interactions, supporting the development of safer, more effective therapeutic interventions and promoting global health and safety.

Keywords: Pharmacology, Toxicology, Therapeutic effects, Adverse effects, Pharmacokinetics, Pharmacodynamics

Abstract Id:PCO/PP-59

Predictive Modeling for Drug Safety and Adverse Event Detection

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Abstract:

Predictive modeling plays a crucial role in enhancing drug safety by using artificial intelligence and machine learning techniques to detect adverse drug events early. By analyzing large datasets such as electronic health records, patient information, and drug interactions, these models can predict potential risks before they become widespread. This approach improves the accuracy and speed of identifying harmful effects compared to traditional methods, which rely on slower manual reporting. Predictive models help healthcare providers and regulatory bodies intervene proactively to protect patients, reduce false alarms, and enhance overall drug safety monitoring. This shift from reactive to proactive pharmacovigilance has the potential to significantly improve patient outcomes and ensure safer use of medications.

Keywords: Predictive modeling, Drug safety, Adverse drug events, Machine learning, Pharmacovigilance, Artificial intelligence, Electronic health records,

Abstract Id:PCO/PP-60

Neuro-Pharma AI: Brain-Inspired Intelligence for Next-Generation Drug Discovery

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Abstract
The integration of neuroscience and artificial intelligence (AI) is giving rise to a new interdisciplinary research field known as Neuro-Pharma AI. Traditional AI systems in drug discovery often rely on static datasets and linear algorithms that lack the adaptability and dynamic learning capacity of the human brain. Neuro-Pharma AI introduces brain-inspired computational architectures, including spiking neural networks and synaptic learning algorithms, to replicate how neurons communicate, adapt, and store molecular information. By mimicking these biological learning processes, AI platforms can analyze complex chemical structures, predict drug–target interactions, and identify novel therapeutic compounds with exceptional precision and speed.This approach not only accelerates the drug discovery pipeline, but also enhances personalized pharmacotherapy, reduces research cost, and minimizes experimental error. The convergence of neuroscience, pharmacy, and artificial intelligence represents a paradigm shift — moving from machines that calculate to machines that think like scientists, redefining the future of pharmaceutical innovation.

Keywords: Neuroscience · Artificial intelligence · Drug discovery · Spiking neural networks · Personalized pharmacotherapy.

Abstract Id:PCO/PP-61

Therapeutic Potential of Rezdiffra for the Treatment of Metabolic Dysfunction Associated Steatohepatitis (MASH)

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Abstract
Metabolic dysfunction associated steatohepatitis (MASH), formerly known as nonalcoholic steatohepatitis (NASH), is a progressive liver disease characterized by steatosis, inflammation, and fibrosis driven by metabolic dysregulation and is a leading cause of cirrhosis and liver transplantation worldwide. Rezdiffra (resmetirom) is the first FDA-approved oral therapy for patient suffering with MASH with moderate to advanced liver fibrosis (F2 to F3). The drug's mechanism of action centers on its role as a highly selective agonist of the thyroid hormone receptor-beta, which is predominantly expressed in the liver. By activating THRbeta, resmetirom upregulates pathways that promote fatty acid beta-oxidation and lipid catabolism while decreasing de novo lipogenesis. This targeted action reduces intrahepatic fat accumulation, mitigates lipotoxicity, and ultimately decreases inflammation and liver fibrosis, addressing the core drivers of MASH progression. Given the complex, multifactorial nature of MASH, research is actively exploring combination therapies to maximize clinical benefit. The most prominent combination strategy under investigation involves pairing resmetirom with GLP-1 agonists, such as semaglutide or tirzepatide. This multimodal approach aims for synergistic effects, combining resmetirom's direct anti-steatotic and anti-fibrotic action with the potent weight loss and systemic metabolic improvements offered by the GLP-1 class, thereby addressing both the liver disease and the underlying metabolic comorbidities. This study aims to summarize the current evidence regarding the therapeutic potential of Rezdiffra, with a focus on its efficacy, safety, and clinical relevance in the management of MASH.

Keywords: Rezdiffra, Resmetirom, THR-β agonist, hepatic fibrosis, fatty liver disease, combination therapy.

Abstract Id:PCO/PP-62

DEEP BRAIN STIMULATION: A PERSONALISED MEDICINE

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Abstract:
Deep Brain Stimulation (DBS) has been developed as an innovative therapeutic treatment approach which has elevated the concept of personalised medicine in the field of neurology and psychiatry. It involves the implantation of electrodes into the specific region of brain i.e. subthalamic nucleus (STN) where through electrical stimulation the abnormal activity such as essential tremor, dystonia, akinesia, postural instability is modulated. Unlike the conventional psychotherapy which opts generic approach, DBS provides customised modulation based on patient's neural circuit map, clinical symptoms and genetic factors. Scientists are continuously thriving for advancement in neuroimaging, AI, closed loop and adaptive DBS system which has added a new dimension to the treatment making it more patient-specific and expanding the scope of DBS for treating other neurological and psychiatric conditions. Thus, DBS has not only achieved a technological advancement but has also filled the voids between the conventional treatment and patient compliance.

Keywords: Adaptive DBS, Closed loop, Deep Brain Stimulation, Electrical stimulation, Personalised medicine.

Abstract Id:PCO/PP-63

RECOGNITION TREATMENT IN DIABETES ASSOCIATED RELATED COMPLICATIONS USING AI

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Abstract
Diabetes Mellitus (DM) is a fastest emerging world health problem, which is a chronic metabolic disorder characterised by increased/abnormal blood sugar levels due to either insufficient insulin production by pancreatic βcells (insulin secretion) or resistance of body tissue towards insulin (insulin action) or both. There are various types of late-stage complications associated with diabetes as diabetes neuropathy (DN), diabetes retinopathy (DR) etc. Early detection of these complications is crucial for its prevention and management. In the recent years. AI approaches in the detection and diagnosis of the diabetic microvascular complications for diabetic retinopathy have been studied. AI is used for the retinal imaging i.e. fundus photography, head-to-head validation studies, etc. AI predictive models achieve high sensitivity and specificity for the early DR detection. In cases of DPN (diabetes peripheral neuropathy) diagnosis by AI is done by quantification of small nerve fibres, nerve conduction studies, corneal confocal microscopy etc. Improved screening AI tools have helped preventing neuropathic pain, foot ulceration etc. Nevertheless, there are major barriers like algorithm transparency, data standardization, regulatory validation, largescale diagnosis adaptation. In conclusion Artificial intelligence (AI) is as an emerging technology utilised at the frontlines of the clinical practice that helps in predicting and diagnosis of the diseases and analysing the data for better screening in early diagnosis of diabetic related complication for its prevention and management.

Keywords: Artificial intelligence, diabetic retinopathy, diabetic neuropathy, early diagnosis, machine learning.

Abstract Id:PCO/PP-64

Diabetes mellitus a chronic disorder

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Abstract

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia due to deficiencies in insulin secretion or action. Ayurvedic medicine has long emphasized plant-based treatments for diabetes, among which Pterocarpus marsupium (Vijaysar) holds significant therapeutic promise. The heartwood extract of Pterocarpus marsupium contains bioactive compounds like epicatechin and pterostilbene that exhibit potent antidiabetic, antioxidant, and anti-inflammatory properties. Experimental studies using diabetic animal models demonstrate that aqueous and alcoholic extracts of P. marsupium significantly reduce fasting and postprandial blood glucose levels. These extracts enhance insulin secretion, improve insulin sensitivity, and exert protective effects on pancreatic β-cells, mitigating the damage caused by diabetes-induced oxidative stress. Additionally, P. marsupium modulates inflammatory cytokines such as tumor necrosis factor-alpha (TNF-α), which is elevated in type 2 diabetes, reducing systemic inflammation. Clinical observations also report improvements in lipid profiles and reduction in diabetes-associated symptoms. The combined effects of Pterocarpus marsupium on glycemic control and β-cell preservation underscore its potential as a complementary and alternative therapeutic agent in diabetes management. This review synthesizes evidence from in vivo studies and highlights the molecular mechanisms underlying the antidiabetic action of Pterocarpus marsupium. Incorporating this herbal remedy could improve the efficacy and safety profile of diabetes treatment regimens.

Keywords : Pterocarpus Marsupium, Vijaysar , Antidiabetic , Oxidative stress, Anti-hyperlipidemic

Abstract Id:PCO/PP-65

BTK Inhibitors: Dual Action in Cancer and Autoimmune Disease

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Abstract

Bruton's tyrosine kinase (BTK), a member of the Tec-family of non-receptor tyrosine kinases, is a pivotal regulator of B-cell receptor (BCR) and Fc-receptor signaling, controlling B-cell maturation, activation, and survival. Aberrant BTK signaling contributes to the pathogenesis of various B-cell malignancies—including mantle cell lymphoma (MCL) and chronic lymphocytic leukemia (CLL)—as well as autoimmune disorders such as rheumatoid arthritis and systemic lupus erythematosus. The introduction of the first-in-class covalent BTK inhibitor, ibrutinib, has transformed therapeutic outcomes in hematologic cancers, demonstrating remarkable efficacy and durable responses. Building on this success, next- generation BTK inhibitors such as acalabrutinib, zanubrutinib, and orelabrutinib offer enhanced selectivity and reduced off-target effects. Additionally, reversible (non-covalent) inhibitors, PROTAC degraders, and dual-target agents are expanding therapeutic possibilities, especially in overcoming resistance driven by mutations like BTK C481S. Beyond oncology, BTK inhibition is emerging as a promising approach in autoimmune diseases, where dysregulated B-cell and myeloid signaling drive chronic inflammation. Ongoing clinical studies indicate that BTK inhibitors can modulate immune cell activity, offering a dual benefit—anti-tumor efficacy and immune regulation. Integrating biomarker-guided strategies and rational combination regimens (e.g., BTK inhibitors with BCL-2 or PI3K inhibitors) holds potential to enhance therapeutic precision and durability. Altogether, advances in BTK inhibitor development are redefining the treatment landscape across cancer and autoimmunity, underscoring their role as versatile agents in precision
medicine.

Keywords: Bruton's Tyrosine Kinase, Kinase Inhibitors, Oncology, Autoimmune disorders

Abstract Id:PCO/PP-66

Nasal Route for Vaccination: The Future of COVID-19 and Respiratory Disease Immunization

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Abstract:
The emergence of COVID-19 has highlighted the need for vaccination strategies that not only induce systemic immunity but also provide strong mucosal immune responses at the site of viral entry. The nasal route of vaccination offers a promising advancement toward effective prevention of respiratory infections, including COVID-19, influenza, RSV, and emerging coronaviruses. Intranasal vaccines stimulate both systemic IgG and mucosal IgA immune responses, providing a dual defense that inhibits viral colonization in the upper respiratory tract. This is particularly crucial, as SARS-CoV-2 primarily infects the nasopharyngeal mucosa before systemic spread. Additionally, intranasal delivery eliminates the need for needles, improving patient compliance, enabling mass immunization, and reducing the risk of needle-associated infections. Modern formulation advances, such as nanoparticles, liposomes, virus-like particles (VLPs), and chitosan-based adjuvants, further enhance antigen stability and mucosal absorption. Several intranasal COVID-19 vaccines, such as iNCOVACC (India) and Convidecia Air (China), have recently received approval, demonstrating safety and effective immunogenicity. Despite these advantages, challenges persist, including mucociliary clearance, limited antigen uptake, and formulation stability concerns. Future research is directed toward optimizing carrier systems and improving mucosal targeting strategies. In conclusion, intranasal vaccination represents a transformative step in respiratory vaccination platforms, offering a highly effective, painless, and patient-friendly approach that strengthens public health preparedness against current and future pandemics.

Keywords: Intranasal vaccine, mucosal immunity, COVID-19, IgA, nanoparticles, drug delivery.

Abstract Id:PCO/PP-67

Evaluation of the Gastroprotective and Anti-Esophagitis Potential of Ipomoea aquatica Extract in Experimentally Induced Esophagitis in Rats

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Abstract
Esophagitis is an inflammatory condition of the esophageal mucosa commonly associated with oxidative stress, acid reflux, and mucosal injury. Conventional drugs such as proton pump inhibitors and H_2 antagonists are effective but often produce adverse effects during long-term therapy. Hence, herbal alternatives with antioxidant and mucosal protective properties are being explored. Ipomoea aquatica Forsk. (water spinach) is a medicinal plant traditionally used for treating gastrointestinal disorders due to its rich content of flavonoids, alkaloids, and phenolic compounds.
The present study aims to evaluate the gastroprotective and anti-esophagitis potential of Ipomoea aquatica extract in experimentally induced esophagitis in rats. Experimental models such as ethanol and hydrochloric acid-induced esophagitis will be used. The extract will be assessed for its effects on gastric pH, acidity, antioxidant enzyme levels (SOD, CAT, GSH), lipid peroxidation, and histopathological changes.
It is expected that I. aquatica extract will exhibit significant protection of gastric and esophageal mucosa, supporting its potential as a natural therapeutic agent against esophagitis and related gastric disorders.

Keywords:- Ipomoea aquatica, esophagitis, gastroprotective, antioxidant, anti-inflammatory, mucosal protection, herbal medicine.

Abstract Id:PCO/PP-68

Advancing Cancer Treatment with Cisplatin and Nanotechnology

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This report provides a comprehensive analysis of cis-diamminedichloroplatinum(II) (cisplatin), a foundational-yet-paradoxical agent in modern oncology. The analysis traces the drug's remarkable journey from a serendipitous biophysical discovery at Michigan State University to its establishment as a "gold standard" curative chemotherapy, responsible for transforming the prognosis of several malignancies.

The central thesis of this report is that cisplatin's profound therapeutic efficacy, which is rooted in its fundamental mechanism of inducing catastrophic DNA damage , is inextricably linked to its severe, dose-limiting systemic toxicities.

Key findings from this investigation detail cisplatin's broad-spectrum utility, most notably its role in curing testicular cancer and its foundational use in treating lung, ovarian, and head and neck cancers. The report then critically analyzes the drug's severe adverse drug reactions (ADRs)—particularly its irreversible ototoxicity (hearing loss) and dose-limiting nephrotoxicity (kidney damage) —and the complex clinical strategies required to mitigate them, such as aggressive hydration protocols and multi-drug antiemetic regimens.

The report concludes that the future of platinum-based therapy lies not in replacement but in refinement. It investigates the critical pivot toward advanced biotechnological platforms designed to enhance precision. These platforms, including nanocarriers like liposomes and molecularly-engineered "smart bombs" like antibody-drug conjugates (ADCs) , aim to harness cisplatin's unmatched potency while eliminating its systemic, off-target toxicity. This technological evolution represents one of the most critical endeavors in modern pharmacology.

Keywords: Adverse drug reactions, Antibody-drug conjugates

Abstract Id:PCO/PP-69

Engineering of bile acid derived biomaterials for cancer therapy and their mechanistic studies

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Abstract

Cancer continues to be a significant global health issue due to its complex biology and the unchecked proliferation of genetically modified cells. Biomaterials derived from bile acids present a promising therapeutic option because of their amphiphilic characteristics, biocompatibility, and strong affinity for cellular membranes. This research explores two amphiphiles based on bile acids, LCA-PYRROL and LCA-PIP, which showed significant anticancer efficacy along with favorable safety profiles. Their inclusion in hydrogel formulations (PYRROL-Gel and PIP-Gel) further improved therapeutic effectiveness by hindering tumor development, enhancing survival rates, and reducing systemic toxicity. Moreover, a hydrogel-based chemoimmunotherapy method that combines imiquimod (IMQ) with these anticancer agents resulted in synergistic effects, decreasing tumor size, preventing recurrence, and promoting systemic immune activation. This approach holds promise for managing both localized and metastatic cancers. Mechanistic investigations indicated that bile acid–derived biomaterials function through various pathways, including enhanced cellular uptake via membrane insertion and mitochondrial destabilization, ultimately leading to cancer cell death. In summary, the results emphasize engineered bile acid-based biomaterials and their hydrogel formulations as versatile and efficient options for advanced cancer treatment.

Keywords:Cancer, bile-acid derivative, hydrogel, amphiphiles, cancer therapy, LCA- PYROLL and LCA-PIP, anticancer activity, tumor burden red

Abstract Id:PCO/PP-70

Polymer Based Nanoparticles Strategies for Insulin Drug Delivery

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Abstract

Diabetes mellitus is a common metabolic disorder marked by chronic hyperglycemia due to impaired insulin secretion or action. Affecting hundreds of millions worldwide, it is classified as type 1 (T1D) or type 2 (T2D). Insulin therapy remains the primary treatment, but frequent injections and invasiveness often reduce patient adherence and treatment efficiency. To overcome these limitations, research has focused on advanced drug delivery systems (DDSs), particularly nanotechnology-based approaches. Nanoparticles (NPs), with sizes typically between 1–100 nm, offer precise control, enhanced bioavailability, and targeted insulin delivery. They enable sustained and controlled drug release while reducing dosing frequency. Polymer-based nanoformulations, generally 100–1000 nm in size, combine biocompatible polymers with insulin to improve therapeutic stability and circulation time. Their performance depends on factors such as particle size, molecular weight, and surface charge, which influence their ability to cross biological barriers and reach target tissues. Optimizing these parameters allows prolonged insulin release, better bioavailability, and improved compatibility, making polymeric nanoparticles a promising platform for effective diabetes management.

Keywords : diabetes, insulin, therapeutic, nanoparticles , drug delivery systems, nanotechnology, polymer, bioavailability.

Abstract Id: PCO/PP-71

PRECISION BY LIGHT: TRANSFORMING SKIN CANCER CARE WITH PHOTODYNAMIC THERAPY

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Abstract

A photosensitiser, a particular wavelength of light, and molecular oxygen are all used in photodynamic therapy (PDT), a new minimally invasive cancer treatment that uses reactive oxygen species (ROS) to target and kill cancerous cells. Starting from first-generation porphyrin-based photosensitisers to sophisticated nanoparticle-assisted third-generation systems. This review focuses on basic ideas, workings, and historical progression of the PDT. These developments have greatly improved therapeutic efficacy, light absorption, and tumour selectivity. Lung, prostate, cervical, brain, breast, pancreatic, and skin cancers, particularly non-melanoma skin cancers (NMSC) like basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), are among the many types where PDT shows significant clinical promise. Methyl aminolevulinate (MAL) and 5-aminolevulinic acid (5-ALA) are FDA-approved and widely used agents for treating precancerous and cancerous skin lesions. Recent clinical results indicate that PDT formulations enhanced with nanoparticles and lasers improve photosensitiser delivery, reduce phototoxicity, and achieve higher tumour clearance rates than traditional therapies. Continued research combining nanotechnology, immunotherapy, and targeted drug delivery holds promise for improved efficacy and specificity despite its drawbacks, including limited light penetration and decreased efficiency in hypoxic tumours. In contemporary oncology, PDT is a potent, patient-friendly method that provides accurate tumour ablation with little invasiveness and superior cosmetic results.

Keywords: Photodynamic Therapy (PDT); Photosensitizers; Reactive Oxygen Species (ROS); Skin Cancer; Non-melanoma Skin Cancer; 5-Aminolevulinic Acid (5-ALA); Methyl aminolevulinate (MAL); Nanoparticle Delivery; Targeted Cancer Therapy; Light-Activated Treatment.

Abstract Id: PCO/PP/72

THE ROLE OF NEURAL OBSTRUCTION IN PARKINSON'S DISEASE: INSIGHTS INTO ADVANCED THERAPEUTICS AND BIOTECHNOLOGY

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Abstract
Parkinson's disease (PD), is a progressive neurodegenerative disorder, it continues to challenge The researchers due to its multifactorial etiology and very limited treatment outcomes. Recent evidence suggests that neural obstruction is a disruption in the normal cerebrospinal fluid (CSF) dynamics or neuronal signaling may contribute to the degeneration of dopaminergic neuron in the substantia nigra, impairing dopamine synthesis and transmission. This phenomenon may arise from structural anomalies, neuroinflammation, or hereditary factors that compromise neuronal pathways. In the context of advanced therapeutics and drug delivery technologies, by integrating artificial intelligence (AI) provides transformative potential in understanding and managing PD. AI-based neuroimaging analytics can detect early-stage neural obstruction and predict dopaminergic neuron degeneration with precision. Moreover, AI-driven modeling aids in the design of targeted nanocarrier systems, ensuring efficient blood–brain barrier (BBB) penetration and localized delivery of neuroprotective agents. These smart delivery platforms, coupled with real-time AI feedback, enhance the precision, safety, and personalization of PD therapy. Crucially, this paper also emphasizes the heigh susceptibility of Parkinson's patients to develop related neurodegenerative disorders. This review explores the interplay between neural obstruction, dopamine depletion pathways, oxidative stress, and inflammation, while focusing on how AI-assisted therapeutic designs can revolutionize the Parkinsonism management. By bridging neuropathology with intelligent drug delivery systems, this study highlights the promise of AI-integrated strategies in early diagnosis, target treatment, and the development of next-gen of neurotherapeutics for Parkinson's disease.

Keywords: Neural Obstruction, Parkinson's Disease, Artificial Intelligence, Dopamine Depletion, Substantia Nigra

Abstract Id: PCO/PP-73

Assessment of a Dual Drug Nanovesicular Gel for Managing UV-Induced Skin Cancer in Mice

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Abstract
The present study was designed to evaluate the chemo preventive efficacy of a combinatorial spanlastic gel for UV-induced skin cancer therapy. The preparation of formulation performed by a technique named ethanol injection method, further converted into a Carbopol 934-based gel, and characterized for physicochemical parameters, including pH, spreadability, texture analysis, and extrudability. In vivo efficacy was assessed in a UV-induced skin tumor model in mice by evaluating tumor number, volume, body weight trends, and histopathological features. Spanlastic gel exhibited superior texture properties, spreadability, and extrudability compared to the conventional gel. In vivo, combinatorial gel delayed tumor onset and reduced tumor number and volume. Biochemical assays demonstrated restoration of antioxidant enzymes (superoxide dismutase, catalase, and glutathione), reduction in lipid peroxidation (malondialdehyde). Additionally, a significant downregulation of pro-inflammatory cytokines including tumor necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6), was observed, confirming the formulation's antioxidant and anti-inflammatory effect (p < 0.0001). Histological analysis revealed minimal dysplasia and inflammatory infiltration, indicating protective effects at the cellular level. Overall, the developed gel demonstrated enhanced therapeutic potential against UV-induced skin carcinogenesis and may serve as a promising topical strategy for the management of skin cancer.

Keywords: cancer therapy, UV-induced skin tumor model, Carbopol 934-based gel and TNF-α

Pharmacology
Oral Presentation

Abstract Id: PCO/OP/01

Title: Advancing the Understanding of Traumatic Brain Injury: Pathophysiological Mechanisms, Secondary Damage, and Emerging Neuroprotective Strategies.

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Abstract

Traumatic brain injury (TBI) is a leading cause of death and long-term disability worldwide, predominantly affecting younger populations and posing a serious global health concern. Clinical manifestations range from brief unconsciousness to deep coma or mortality. Despite decades of research, no effective pharmacological treatment currently exists, and most neuroprotective agents have failed to demonstrate clinical success.

The initial or primary insult results from the mechanical impact that causes immediate tissue disruption. In contrast, secondary injury cascades evolve over subsequent hours to days, aggravating neurological deficits. These cascades involve oxidative stress, excitotoxicity, calcium imbalance, blood–brain barrier disruption, cerebral oedema, diffuse axonal injury, haemorrhage, and inflammatory responses driven by cytokines and immune cells. Such processes amplify neuronal loss and impair cognitive, memory, and language functions.

Animal models have been essential in replicating these complex pathologies and exploring novel therapies; however, translating experimental success into effective clinical interventions remains a major challenge. This review highlights key mechanisms underlying TBI pathophysiology—particularly oxidative stress, excitotoxicity, cerebral oxygenation, vascular dysregulation, and neuroinflammation—and underscores the urgent need for innovative neuroprotective strategies. A comprehensive understanding of secondary injury mechanisms may ultimately guide the development of effective therapies and improve outcomes for individuals affected by TBI.

Keywords: TBI, Blood Brain Barrier, Oxidative Stress, Excitotoxicity, Secondary Injury, Primary Injury.

Abstract Id: PCO/OP/02

DRUG REPOURPOSING OF CANCER: OLD MEDICINES, NEW HOPE

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Drug repurposing has proven to be an effective and efficient solution to cancer treatment with the advantage of being less time and cost consuming, as they use drugs with a known safety history. Non-oncology drugs have also exhibited potential anticancer effects in targeting main cancer hallmarks, including uncontrolled cell growth, impaired metabolism and apoptotic resistance. As an example, statins such as simvastatin inhibit the mevalonate pathway, and have shown to be effective in cancers with distortions in lipid metabolism, such as gastric and colon cancer. On the same note, EGFR inhibitors are selective in response to genetic mutations in patients with NSCLC. A big step towards this has been the combination of repurposes drugs with nanotechnology to improve site-specific delivery and treatment effects. The mixed use of repurposed drugs with nanocarriers, demonstrated by clinical trials of nanomedicine

formulations, including liposomal DOX, and nanoparticle-bound drugs like Abraxane and AGuIX, demonstrates the prospect of using nanocarriers to enhance the ability of repurposed drugs to overcome resistance mechanisms and increase efficacy. Although such gains were made, the issues of tumor heterogeneity, lack of clinical translation, and patient-specific reactions through the wide range of genetic backgrounds remain. Nevertheless, the synergistic opportunities of drug repurposing in conjunction with nanotechnology is a potential road forward in cancer treatment in the future. This review highlights how candidate drug specifically address the hallmarks of cancer in tumor cells and the approach of using drug repurposing paired with nanotechnology in cancer treatment.

Keywords: Drug repurposing, Cancer therapy, Nanotechnology, Anticancer drugs

Abstract Id: PCO/OP/03

"Phytotherapy for Anxiety Disorders: Exploring the Anxiolytic Potential of Medicinal Plants"

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Abstract

Anxiety disorders impact 264 million people in the world, and they are caused by dysfunctions in the distributed neural circuits and not localized malfunctions. This review discusses of the pathophysiology of anxiety via concepts of circuits, including the amygdala as the central threat-processing center and cortico-striato-thalamo-cortical (CSTC) loops in cognitive control, with an assessment of evidence-based phytotherapeutic interaction. The amygdala has wide connections with the prefrontal cortex, hippocampus, thalamus, and striatum, which control the detection of threats and fear. The symptoms are common anxiety disorders: hyperactivation of the amygdala, dysfunctional habituation, maladaptive prefrontal-amygdala inhibition, fear de-escalation, and maladaptive GABAergic, glutamatergic, serotonergic, and noradrenergic systems. Multi-target medicinal plants (GABAergic modulators, chamomile, kava, and lavender) and adaptogens (rhodiola and ashwagandha) that have an effect on hypothalamic-pituitary-adrenal axis regulation via benzodiazepine-site agonism and cognitive enhancers (bacopa) have been demonstrated to have evidence-based medicinal potential. It has been demonstrated in clinical trials that chamomile has around 50% symptom reduction, ashwagandha has 56% anxiolytic agency, kava has the benzodiazepine-like effects of reducing anxiety, and bacopa has 20 % anxiety relief and cognitive enhancement in generalized anxiety disorder. These plant-derived interventions reduce anxiety symptoms and improve cognitive resilience, and they are promising, safe and effective alternatives to traditional pharmacotherapy. A combination of phytotherapeutic agents to regulate the GABAergic circulation, the hypothalamic-pituitaryadrenal axis, and cortico-striato-thalamo-cortical (CSTC) loops could be a successful multitarget intervention in the restoration of neurocircuitry in anxiety disorders.

Keywords: anxiety, neural circuits, amygdala, CSTC loops, HPA axis, plant-based therapy.

Abstract Id: PCO/OP/04

Next Generation Medicine in Action: The Power of Gene Therapy and CRISPR

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Introduction:

Gene therapy and CRISPR technologies are innovations that change next-generation medicine at a faster rate than ever. Gene therapy is aimed at directly fixing genes through corrective or substitute reactions to cure a number of genetic diseases in the long term. The innovations of the recent past, such as base editing, have been successful in curing sickle cell disease, and individuals can now live a life filled with no pain and reduced dependence on blood transfusions. Further, CAR-T cell treatments have turned around the way cancer is treated by utilising customised

cells which are genetically designed to detect tumours with precision and reduce their side effects. Gene replacement therapy has also been used to recover some of the vision in genetic blindness, such as Leber congenital amaurosis, and in a series of inherited diseases.

CRISPR technology has become one of the modern marvels in generating the means of precise and efficient gene editing. Current clinical trials consider CRISPR-based treatments of a vast variety of cancers, including blood and neurological disorders.

Artificial intelligence combinations, like CRISPR-GPT, are speeding up the construction of experiments and making them more accessible, making research more efficient, and increasing the potential for therapy. Even though there are some issues regarding the delivery mechanisms and off-target hits, incessant innovations strive to enhance the safety and accuracy. All these developments herald a new era of personalized, on-demand gene therapies that will revolutionize the treatment of genetic and acquired diseases in the future.

Keywords: Gene Therapy, CRISPR, artificial intelligence, Next-generation medicine, personalized therapy.

Abstract Id: PCO/OP/05

Natural Product–Drug Combinations in the Management of Diabetic Nephropathy: From Bench to Bedside

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Abstract

Diabetic nephropathy (DN) is the most common form of end-stage renal disease worldwide, where it is estimated that 30 per cent of all people with diabetes mellitus have nephropathy. Although there have been some important progresses in knowledge about the pathophysiology of diabetic nephropathy, the existing treatment options are mainly confined to renin-angiotensin-aldosterone system (RAAS) blockage using angiotensin-converting enzyme inhibitors (ACEIs) and angiotensin receptor blockers (ARBs), which have incomplete nephroprotective effects. The multifactorial and complex structure of the DN pathogenesis. It has been observed that the potential adjunctive therapy of natural products has distinct modes of action, including TLR4/NF-KB, Nrf2/Keap1 antioxidant response, and TGF-B/Smad-inhibitions, complementing the conventional pharmaceutical interventions. Recent findings indicate that bioactive compounds like quercetin, curcumin, resveratrol, and multi-component traditional medicine formulations have synergistic nephroprotective effects when used with conventional therapies and produce better effects in reducing proteinuria, preserving eGFR, and preventing renal fibrosis than monotherapy strategies do. Clinical trials show superior therapeutic potential and safer side effects, and new technologies, such as nanotechnology-based targeted delivery systems and artificial intelligence-based combination optimization, provide unprecedented possibilities of application in precision medicine. This syntactic survey looks at the mechanistic rationale behind natural product-drug combinations, the existing clinical evidence, and the future directions of translating such promising synergies into evidence-based clinical practice to achieve better DN management results.

Keywords: Nephropathy diabetes patients, natural products, combination therapy, precise medicine, synergistic mechanisms.

Abstract Id: PCO/OP/06

Genetic Determinants of Efficacy and Adverse Effect of Antipsychotic Agents

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Abstract

Drugs to treat Psychosis are categorized as typical or atypical antipsychotics. Typical antipsychotics are effective in management of positive symptoms of schizophrenia. But possess undesirable motor side effects. Atypical antipsychotics treat both positive and negative symptoms of schizophrenia and also induce adverse metabolic effects, such as weight gain. Among atypical antipsychotics, clozapine has proven to be effective for 30–60% of schizophrenia patients. 3 bp deletion allele, located in the serotonin receptor HTR3B promoter region, is dominating in treatment-resistant group and they require higher daily doses. Clozapine response was associated with the HTR2A His452Tyr variant, DRD1 rs265976, DRD2 Taq1A, DRD2 Taq1B and DRD2 rs1125394. An association of DRD2 with haloperidol response and bromperidol response. Risperidone efficacy has been associated with HTR1A, HTR2A, DRD2, COMT and DRD4 gene polymorphisms. Olanzapine response has been associated with 5-HTR2A/2C, GNB-3, choline acetyltransferase and MDR-1 genes. Understanding the genetic variants involved in antipsychotic response and induced side effects will help to illuminate the pathological and etiological mechanisms that underlie psychotic diseases.

Keywords: Anti-psychotic drugs, Singe Nucleotide Polymorphism, Positive and negative symptoms

Abstract Id: PCO/OP/07

The potential use of therapeutics and prophylactic mRNA vaccines in human papillomavirus (HPV)

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Abstract

Human papillomavirus (HPV) infection is one of the major causes of cervical cancer and other anogenital malignancies worldwide. Although the currently available prophylactic HPV vaccines effectively prevent infection by high-risk HPV types, they fail to provide therapeutic benefits for individuals who already have established infections or precancerous lesions. This limitation emphasizes the urgent need for advanced therapeutic approaches. In recent years, messenger RNA (mRNA)-based vaccines have emerged as a promising platform for both prophylactic and therapeutic use against HPV infections. These vaccines encode viral antigens, such as the E6 and E7 oncoproteins, which play a crucial role in HPV-induced carcinogenesis. Upon administration, mRNA vaccines stimulate strong humoral and cellular immune responses that can target and eliminate HPV-infected cells. Preclinical studies have demonstrated effective antitumor responses and regression of HPV-positive lesions, while ongoing research continues to explore their translation into clinical settings. The mRNA vaccine technology offers several advantages, including rapid production, safety, flexibility in antigen design, and the ability to induce targeted immune activation. However, challenges such as mRNA instability, delivery efficiency, and immune evasion by tumors must still be addressed. Overall, mRNA-based vaccines represent a next-generation strategy in preventing and treating HPV-associated diseases, offering a potential breakthrough in cervical cancer immunotherapy and global women's health.

Keywords: HPV · Cervical cancer · mRNA vaccine · Therapeutic vaccine · Prophylactic vaccine · E6/E7 oncoproteins · Immunotherapy · Cancer prevention.

Abstract Id: PCO/OP/08

Evaluating Fezolinetant's Neuroprotective Effects in Alzheimer's Disease through Computational approaches

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Abstract

The increasing prevalence of Alzheimer's disease (AD) necessitates the exploration of novel therapeutic agents with neuroprotective properties. This study investigates the potential of Fezolinetant, a selective neurokinin-3 receptor antagonist, in mitigating neurodegenerative processes associated with AD using advanced computational

methodologies. Molecular docking simulations and dynamic simulations were employed to elucidate the binding affinity of Fezolinetant to key targets implicated in AD pathology, including amyloid-beta aggregation and tau hyperphosphorylation. Additionally, network pharmacology approaches were utilized to identify potential signaling pathways and biological processes affected by Fezolinetant, offering insights into its mechanism of action. Results highlighted significant interactions that suggest Fezolinetant may modulate neuroinflammatory responses and oxidative stress, contributing to neuroprotection in AD models. Overall, this computational exploration provides a foundational understanding of Fezolinetant's therapeutic potential in AD, paving the way for further experimental validation and clinical translation. Future studies should focus on integrating these findings with in vivo models to comprehensively assess the neuroprotective capabilities of Fezolinetant and its viability as a therapeutic candidate in Alzheimer's disease.

Keywords: Alzeimers Diseases, Fezolinetant, Molecular Docking, Experimental Evidences.

Abstract Id: PCO/OP/09

Invitro and in silico immunomodulatation of nitric oxide production and interference with TLR4-M2 receptor

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Abstract

The imbalance in reactive oxygen/nitrogen species causes oxidative stress which contributes to chronic inflammation and diseases. In this study, the immunomodulatory potential of the natural product 'Apigenin (4,5,7-trihydroxyflavone)' (APG) and its derivative 'Apigenin-7-O-β-D-(6″-p-coumaroyl)- glucopyranoside' (APG- 7) was elucidated through cell-based spectrophotometry, chemiluminescence, and fluorescent microscopy. Their effects were assessed on the production of superoxide anion, myeloperoxidase-dependent hypochlorite anion,intracellular oxidative stress and nitric oxide (NO). Moreover, their cellular toxicity was investigated on 3 T3 fibroblast cell line. APG significantly reduced superoxide anion (48.2 %) and hypochlorite production (IC_{50} = 27.2 µg/mL), while APG-7 showed minimal activity in these assays. Both compounds inhibited NO production, with APG showing stronger inhibition (98 %) than APG-7 (55 %). However, APG was more cytotoxic (IC_{50} =4.5 µg/mL) as compared to APG-7 (~25 µg/mL), indicating a safer profile of APG-7. NO is produced by LPS triggered activation of Toll-like receptor 4 (TLR4), therefore in-silico molecular docking and dynamics simulation were performed to deduce the binding affinity of APG and APG-7 at TLR4/MD-2 interface. Our in- silico findings suggest that both the compounds may target TLR4/MD-2 interface to inhibit the production of NO. Overall, the results support the immunomodulatory potential of APG and APG-7, warranting further investigation

Keywords: nitric oxide, immunomodulation, TLR4

Abstract Id: PCO/OP/10

Evaluation of analgesic and anti-inflammatory potential of the hydroalcoholic extract of Hamamelis virginiana.L

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Abstract

Aim: The aim of this experiment was to analyze the hydro-alcoholic extract of Hamamelis virginiana.L for its analgesic and anti-inflammatory activity. Materials and Method: Analgesic activity was evaluated by Eddy's hot plate and Carrageenan induced paw edema method was utilized for the evaluation of the anti-inflammatory activity. Results: Preliminary phytochemical evaluation revealed the presence of flavonoids, glycosides, tannins, carbohydrates and proteins. The analgesic activity of the higher dose (500 mg/kg body weight) was noticed at 30, 60 and 120 min; reaching maximum at 120 minutes i.e. 9.1sec and 9.8 sec for standard and extract respectively, while the lower dose(250 mg/kg body weight) exhibited maximum effect of 6.9 sec ($p < 0.05$) at 60 mts. The latency time of the standard and the higher dose increased significantly ($p < 0.001$) when compared to the control. Higher dose of the extract significantly ($p < 0.001$) lowered the paw volume beginning from 30 minutes after the administration of carrageenan when compared to the control signifying anti-inflammatory activity. The highest percentage inhibition of extract and standard was observed at 120 mts i.e. 74.2% and 80.4 % respectively. Conclusion: The results of the study confirm that the hydro- alcoholic extract exhibit analgesic and anti-inflammatory properties which may be due to the synergistic activity of the different phytoconstituents present in the plant However, further in depth study is required to identify the active constituents that may be responsible for these activities.

Keywords: Analgesic, Anti-inflammatory, Hamamelis virginiana.L

Abstract Id: PCO/OP/11

Targeting inflammatory pathways through nature's bioactive compounds

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Abstract

Body has many defence of mechanisms in which one of the crucial mechanisms is inflammation that helps to maintain tissue homeostasis and helps in inducing health and wellness of body but when inflammation occurs prolonged time generating a chronic inflammation which itself contributes in developing many pathophysiological diseases including rheumatoid arthritis, diabetes, neurodegeneration, cardiovascular disease etc. Allopathic therapies like NSAIDs, corticosteroids are meant to treat these diseases, but continuous use of these medications flourishes several toxicities including renal dysfunction, immune suppression and gastrointestinal toxicities.

As of today's scenario, medicinal plants came into the sight of significant scientific based interest which is safer and is holistic alternative medicine. This review is based on the comprehensive knowledge acknowledging anti-inflammatory potential of medicinal plants and different phytoconstituents namely flavonoids, polyphenols, terpenoids, alkaloids, and organosulfur compounds acting through multiple molecular targets, key inflammatory mediators like NF-kB, LOX, COX ,iNOS and cytokines such as IL-1β,IL-6, and TNF-α exhibit strong antioxidant activity. Few examples of herbal medicine include Withania somnifera, Curcuma longa, Camellia sinensis, Zingiber officinale, Boswellia serrata etc. which illustrate clinical and preclinical studies evidently. Furthermore, polyherbal formulations have synergistic effects by exhibiting activity through multiple pathways and promoting bioavailability.

In spite of the fact that the medicinal benefits of plant-based anti-inflammatory agents is potentially promising, there is always a need for standardization, extensive mechanistic research and large-scale clinical validation that will help in establishing their quality, efficacy, safety for the use of alternative medicine in treating chronic inflammation.

Keywords: Anti-inflammatory activity, medicinal plants Curcuma longa, NF-kB, cytokines inhibition, phytoconstituents, polyherbal formulations.

Abstract Id: PCO/OP/12

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THE DUAL BENEFITS OF FENUGREEK IN ANTI-AGING INTERVENTIONS: MOLECULAR PROTECTION AND DERMAL ENHANCEMENT

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Abstract
Fenugreek (Trigonella foenum-graecum L.) has emerged as a potent natural candidate for combating oxidative stress and aging-related physiological decline. Recent mechanistic, in-vitro, and clinical investigations have highlighted its multifaceted bioactivities. Ethanolic fenugreek seed extract demonstrated significant inhibition of collagenase activity and downregulation of pro-inflammatory mediators (MMP-1, MMP-9, IL-6, IL-8), promoting collagen synthesis and fibroblast viability. Nanoencapsulation using liponiosomes enhanced its bioavailability, stability, and transdermal delivery efficiency, indicating strong potential in cosmeceutical formulations. Furthermore, standardized topical applications of fenugreek extracts (INDUS1520 and INDUS1530) in clinical trials significantly improved skin hydration, firmness, and reduced wrinkle depth without adverse effects. Blue Fenugreek Kale Extract (BFKE) supplementation exhibited protective effects against pollution-induced oxidative stress by decreasing protein carbonylation and transepidermal water loss while improving skin moisture and barrier function. In addition, in vitro and in vivo findings revealed fenugreek's ability to inhibit advanced glycation end products (AGEs) formation through carbonyl-trapping mechanisms, thereby preventing glycation-induced memory decline and cellular aging. Collectively, these studies establish fenugreek as a safe and effective bioactive ingredient with dual benefits preventing molecular and structural damage while enhancing dermal health and longevity. Its integration into nutraceutical and skincare formulations represents a promising natural strategy for anti-aging interventions.

Keywords: Fenugreek, anti-aging, collagen synthesis, blue fenugreek kale, glycation, nanoencapsulation, oxidative stress, skin hydration.

Abstract Id: PCO/OP/13

Evaluation of Caryota urens in STZ-induced diabetes in experimental animals

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Abstract
Background: Caryota urens is a wild palm species which has been used indigenously to treat diabetes. However, the anti-diabetic activity of the plant's fruit has not yet been evaluated. Therefore, the study aimed to evaluate the antidiabetic activity of C. urens ethanolic extract in streptozotocin-induced diabetic rats.
Methods: The ethanolic extract was prepared from shed dried ripe fruit pulp of C. urens using the Soxhlet apparatus. Streptozotocin was used to induce diabetes in experimental animals. Ethanolic extract at doses of 100 mg/kg & 200mg/kg was given to the respective animals. On Day-0 and Day-15th of the experiment, body weight, fasting blood sugar level, serum lipid profile, liver markers, and creatinine were estimated. All the data is expressed as a mean ± standard deviation & statistically evaluated by student t-test & means were considered to be significantly different at $P < 0.05$.
Results: Body weight was significantly decreased in the diabetic control & standard group. A significant reduction in blood sugar was noted on day 15 in the standard, ethanolic extract 100 mg/kg & 200mg/kg groups. Significant corrections in dyslipidaemia & liver biomarkers were noted in the standard & ethanolic extract groups compared to the untreated diabetic control group.
Conclusion: The ethanolic extract at 100mg/kg & 200mg/kg showed significant reduction in blood sugar and significant corrections in dyslipidaemia. Antidiabetic effect of ethanolic extract 200mg/kg was found to be better than lower dose of ethanolic extract.

Keywords: Diabetes, Dyslipidaemia, Caryota urens, streptozotocin, Liver biomarker

Abstract Id: PCO/OP/14

Decoding the Neurotoxic Potential of Lomefloxacin and Ciprofloxacin through Computational and Experimental Approaches

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Abstract

Fluoroquinolone antibiotics including lomefloxacin and ciprofloxacin are clinically beneficial but may be associated with neurotoxic adverse effects. It is important to understand how they impact on nervous system in order to use them safely in therapy. Investigate the neurobehavioral and neurotoxicological potentiality of lomefloxacin and ciprofloxacin through integrated in silico and in vivo methodologies. Molecular docking is performed to predict interactions with IL6, TNFα, and NFKβ receptors, analyzing binding affinities and conformational stability to infer potential disruption of inhibitory neurotransmission. In vivo studies will be conducted in Sprague Dawley (SD) rats following repeated dosing. Behavioral parameters depression, locomotion, and cognition will be evaluated using the open field, elevated plus maze, Y-maze tests, Force Swim Test (FST), and Tail Suspenssion Test (TST). Oxidative stress biomarkers and brain histopathology are assessed to confirm neuronal alterations. Docking and simulation analyses indicate stable receptor binding suggestive of GABAergic interference, while animal studies are expected to reveal dose-dependent behavioral and oxidative stress changes. This combined computational and experimental framework provides mechanistic insight into fluoroquinolone-induced neurotoxicity and supports the rational development of safer antimicrobial agents.

Keywords: Neurotoxic, Fluoroquinolone, Molecular Docking, Depression, Oxidative Stress.

Abstract Id: PCO/0P/15

Nature to Neurons: Neuropharmacology and Molecular Docking of Herbal Anti-Anxiety Agents

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Abstract

Anxiety is a maladaptive state marked by excessive fear and hyperarousal arising from imbalance of inhibitory GABAergic tone, serotonergic signaling, and stress-axis activation in limbic–cortical circuits. Among herbal anxiolytics, Passiflora incarnata reduces anxiety-like behavior via engagement of GABA systems and flumazenil-sensitive actions, indicating GABA-A site involvement. Withania somnifera (Ashwagandha) exhibits GABA-mimetic activity in electrophysiology and improves sleep/anxiety outcomes, supporting receptor-level mechanisms relevant to drug discovery. Mechanistically, leading botanicals enhance inhibitory neurotransmission at GABA-A/GABA-B, modulate GABA uptake, and temper stress-responsive pathways, collectively restoring network inhibition. For molecular docking, high-resolution templates of GABA-A αβγ assemblies and GABA-B Venus-flytrap domains allow screening of flavonoids and withanolides to predict binding at benzodiazepine and allosteric pockets that correlate with flumazenil antagonism and electrophysiologic potentiation. In Passiflora, HPLC-defined flavones (vitexin/isovitexin) produced in vivo anxiolysis blocked by flumazenil, aligning with docking to GABA-A benzodiazepine interfaces and uptake modulation observed in synaptosomal assays. Indirubin, a plant-derived indole, showed significant anxiolytic-like behavior and favorable docking to GABAAα3 with binding energy around −7.7 kcal/mol, outperforming diazepam in the same protocol, supporting a GABAergic pathway hypothesis for lead prioritization. In conclusion, converging PubMed evidence positions GABA-centric targets as

primary nodes for herbal anxiolysis, while docking against GABA-A/GABA-B structures expedites phytochemical triage toward receptor-directed candidates ready for electrophysiological validation and translational testing.

Keywords: GABA-A, GABA-B, Passiflora incarnata, Withania somnifera, molecular docking, herbal anxiolytics

Abstract Id: PCO/OP/16

Cancer : Mutations and new vaccines for cure

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Abstract

Cancer is one of the most serious diseases in the world today, caused mainly by genetic mutations that change how cells grow and divide. These mutations affect important genes like **TP53**, **BRCA1/2**, and **KRAS**, leading to uncontrolled cell growth and tumor formation.

Recent research in molecular biology and pharmacogenomics has helped scientists understand these mutations better and develop drugs that specifically target cancer cells while reducing side effects.

This brings us to a revolutionary concept in oncology : a vaccine by **Moderna and Merck mRNA-4157**. This isn't a one-size-fits-all drug it's an Individualized Neoantigen Therapy (INT).

The core idea is to fight cancer by training the patient's own immune system. Since every tumor has a different genetic fingerprint, the vaccine is designed to target the unique mutations—in any cancer gene—that are specific to that patient. These mutations create abnormal proteins called neoantigens. Scientists sequence the tumor, use an algorithm to select up to 34 of the best neoantigens, and then create a custom mRNA strand containing those blueprints.

The vaccine's main Active Pharmaceutical Ingredient (API) is that synthetic messenger RNA (mRNA). When the patient receives it, the mRNA acts as a blueprint, teaching the immune system's T-cells exactly which foreign proteins to hunt down and destroy. It's personalized medicine at its most precise.

Keywords : Cancer , Mutations , mRNA vaccine.

Abstract Id: PCO/OP/17

Approval of Inluriyo (imlunestrant) for ER-positive, HER2-negative, ESR1-mutated Advanced or Metastatic Breast Cancer

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Abstract

Breast cancer is the most frequently diagnosed malignancy and the leading cause of cancer-related death among women globally. It accounts for approximately 1 in 4 cancer cases and 1 in 6 cancer deaths among women. While the disease predominantly affects women, men represent about 1% of all breast cancer cases. The global burden continues to rise, influenced by lifestyle factors, genetic predispositions, and increased life expectancy. On September 25, 2025, the U.S. Food and Drug Administration (FDA) approved Inluriyo for the treatment of adults with ER^+, $HER2^-$, ESR1-mutated advanced or metastatic breast cancer who have experienced disease progression following at least one line of endocrine therapy. The approval was based primarily on the Phase III EMBER-3 trial (NCT04975308), which enrolled 874 adult patients with ER^+, $HER2^-$ locally advanced or metastatic breast cancer previously treated with an aromatase inhibitor ± a CDK4/6 inhibitor. Endocrine-receptor positive (ER^+), HER2-negative ($HER2^-$) breast cancers represent a major subset of breast cancer. A significant mechanism of resistance to standard endocrine therapies (such as aromatase inhibitors and selective estrogen receptor modulators) is mutation of the estrogen receptor gene, ESR1, which leads to constitutive activation of the receptor and diminished response to hormonal therapies. Inluriyo (generic name: imlunestrant) is an oral selective estrogen receptor antagonist and degrader (SERD) developed by Eli Lilly and

Company. It binds to the estrogen receptor (ER), blocks its activation, and promotes its degradation, thereby targeting ER-driven growth including in ESR1-mutant cancers.

Keywords: Breast cancer, Food and Drug Administration, Inluriyo, Endocrine therapies, Selective estrogen receptor antagonist

Abstract Id: PCO/OP/18

Therapeutic Approaches to Enhance Neuronal Survival in Ischemic Stroke: Insights from Experimental Model

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Abstract

Ischemic stroke, a leading cause of mortality and long-term disability worldwide, results from the sudden interruption of cerebral blood flow leading to neuronal injury and death. Despite advances in acute interventions such as thrombolytic therapy and mechanical thrombectomy, the therapeutic window remains narrow, and neuroprotective strategies are still an unmet clinical need. Recent experimental models have provided valuable insights into molecular and cellular mechanisms underlying neuronal survival and regeneration following ischemic insult. This study reviews and integrates current therapeutic approaches aimed at enhancing neuronal survival, including pharmacological interventions, stem cell therapy, gene modulation, and antioxidant and anti-inflammatory strategies. Experimental evidence highlights the roles of neurotrophic factors, mitochondrial stabilization, inhibition of excitotoxicity, and promotion of angiogenesis and neurogenesis in mitigating ischemic damage. Moreover, preconditioning strategies and the modulation of signaling pathways such as PI3K/Akt, MAPK/ERK, and Nrf2 have emerged as promising avenues for neuronal protection. Translational models bridging in-vitro and in-vivo studies are instrumental in understanding dose-response relationships, timing of intervention, and long-term functional recovery. The integration of these findings paves the way for the development of multi-target neuroprotective therapies. This abstract emphasizes the importance of experimental research in identifying novel therapeutic targets to enhance neuronal survival and improve clinical outcomes in ischemic stroke patients.

Keywords: Ischemic stroke, neuronal survival, neuroprotection, experimental models, neurogenesis, oxidative stress, PI3K/Akt pathway, anti-inflammatory therapy, stem cell therapy, neurotrophic factors.

Abstract Id: PCO/OP/19

"Integrative Approach to Hypertension: Interaction of Traditional Indian Spices with Antihypertensive Drugs"

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Abstract

Traditional Indian spices have been an integral part of Ayurvedic and dietary practices for centuries, offering diverse therapeutic benefits beyond their culinary use. Recent pharmacological investigations have revealed that bioactive constituents present in spices such as turmeric, black pepper, garlic, ginger and cinnamon possess significant cardioprotective and antihypertensive properties. These effects are attributed to their antioxidant, anti inflammatory, vasodilatory, and lipid-lowering mechanisms, which contribute to improved endothelial function and vascular health. However, when these spices are consumed alongside conventional antihypertensive drugs including beta-blockers,

ACE inhibitors, angiotensin receptor blockers, and calcium channel blockers, they may exhibit pharmacodynamic and pharmacokinetic interactions that can alter therapeutic outcomes. Such interactions may lead to synergistic blood pressure lowering effects or conversely enhanced toxicity or reduced efficacy due to changes in drug metabolism, receptor sensitivity, or bioavailability. Piperine from black pepper is known to enhance drug absorption by inhibiting hepatic and intestinal enzymes, while allicin from garlic may potentiate the hypotensive action of antihypertensive agents. Understanding these herb–drug interactions is critical for optimizing combination therapies and ensuring patient safety.

Keywords: Traditional Indian spices, Antihypertensive drugs, Herb–drug interactions, Pharmacodynamics, Pharmacokinetics, Cardiovascular health, Cinnamon, Ginger, Turmeric,
Synergistic effects, Integrative medicine.

Abstract Id: PCO/OP/20

INTEGRATIVE NETWORK PHARMACOLOGY APPROACH TO DECIPHER THE MOLECULAR MECHANISM OF GREEN TEA AND ROSEMARY IN WOUND HEALING

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Abstract
Wound healing is the biological process by which the body repairs damaged tissue after an injury to the skin or other organs. Green tea (Camellia sinensis) and rosemary (Rosmarinus officinalis) are rich in polyphenols and terpenoids known for their antioxidant and anti-inflammatory actions. These phytochemicals can modulate molecular pathways linked to wound repair. Network pharmacology provides an integrative platform to explore how bioactive compounds regulate inflammatory and apoptotic mediators such as IL-6, TNF-α, and Caspase-3, which are central to tissue regeneration. To elucidate the wound healing potential of green tea and rosemary through in silico network pharmacology in targeting IL-6, TNF-α, and Caspase-3. Active phytoconstituents were screened against IL-6, TNF-α, and Caspase-3 using network pharmacology. Protein–protein interaction (PPI) networks were constructed to identify key signaling nodes related to inflammation and apoptosis.
The integrated network and KEGG analysis suggest that green tea and rosemary bioactive likely enhance wound healing by modulating, inflammation suppression (IL6, TNF), apoptosis and cell survival balance (CASP3, BCL2, TP53) and Angiogenesis and tissue regeneration (HIF1A, mTOR, STAT3, ESR1). These findings support their multi-target therapeutic potential through network pharmacology mechanisms involving IL-6, TNF, and CASP3 regulation. Network analysis identified TNF, IL6, and CASP3 as core targets mediating the anti-inflammatory and antioxidant effects.
Network pharmacology suggests that synergistic modulation of IL-6, TNF-α, and Caspase-3 by bioactive of green tea and rosemary can attenuate inflammation, prevent excessive apoptosis, and accelerate wound healing.

Keywords: Green tea; Rosemary; Network pharmacology; IL-6; TNF-α; Caspase-3; Wound healing

Abstract Id: PCO/OP/21

ELUCIDATION OF MECHANISTIC PATHWAY OF PHYTOCONSTITUENTS IN MANAGEMENT OF ANDROGENIC ALOPECIA

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Abstract

Androgenetic alopecia (AGA) is the most common hair loss disorder, affecting both men and women due to androgen hypersensitivity, leading to hair follicle miniaturization. Current FDA-approved treatments like finasteride and minoxidil often cause side effects such as sexual dysfunction and dermatitis. Phytoconstituents from rosemary (Rosmarinus officinalis) and green tea (Camellia sinensis), known for antioxidant, anti-inflammatory properties show promising in promoting hair growth and inhibiting DHT, but their mechanisms remain unclear. This study aimed to elucidate the active phytoconstituents, assumed targets, and underlying mechanisms of rosemary and green tea against AGA using network pharmacology. Bioactive compounds were screened from PubChem and literature. Targets were predicted via SwissTargetPrediction. AGA-related genes were collected from Gene Cards. Common targets were identified via Venn diagram. Protein-protein interaction (PPI) network was constructed using STRING and analysed in Cytoscape with CytoHubba for hub genes (top 10 via MCC). KEGG enrichment was performed in David database. Rosemary and green tea, target 212 genes in total out of which, 191 genes are implicated in alopecia, suggesting a 7% overlap between the drug's gene targets and alopecia-associated genes. This overlap indicates rosemary and green tea might influence alopecia, as there is a significant intersection of target genes relevant to the disease. Network revealed 10 hub genes some of which include STAT3, BCL2, ESR1, HIF1A. Core compounds showed involvement in hormone response, apoptosis and MAPK/HIF-1 pathway. Rosemary and green tea exert anti-AGA effects through multi-component, multi-target interactions, modulating MAPK and HIF-1 pathways, offering insights for novel, safe therapies.

Keywords: Androgenetic Alopecia; Rosemary; Green Tea; Network Pharmacology; MAPK; HIF-1

Abstract Id: PCO/OP/22

Nanoparticle-Mediated Precision Delivery of DMARDs for Rheumatoid Arthritis: From Molecule to Targeted Therapy

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Abstract

Rheumatoid arthritis (RA) is a chronic, systemic autoimmune disorder that limits systemic toxicity, joint bioavailability, and patient compliance with conventional disease-modifying antirheumatic medications (DMARDs) like methotrexate and leflunomide and biologics. Nanoparticle (NP)-based delivery technologies aid precision distribution by improving solubility, circulation, targeted accumulation, and active or stimuli-responsive DMARD payload release at inflamed synovia. Recently, preclinical and translational research has produced many techniques, such as lipid nanoparticles, polymeric and hybrid carriers, inorganic cores (e.g. MnO_2, magnetic), and biomimetic coatings. These methods are useful for passive accumulation in inflammatory joints, immune-cell tropism, and folate, RGD, and antibody targeting. Modern methods include re-formulating small-molecule DMARDs (particularly methotrexate) into sustained-release or pH/ROS/enzyme-responsive NPs, co-delivering anti-inflammatory drugs or siRNA for synergistic modulation of pathogenic pathways, and theranostic platforms that integrate imaging and therapy for patient stratification and real-time monitoring. In various animal models, these techniques improved disease suppression, off-target toxicity, and pharmacokinetics. Clinical translation challenges include scalable GMP production, long-term safety and immunogenicity assessment, predictable biodistribution and clearance, and combination and theranostic medication regulatory conformance, despite promising results. Standardized preclinical models for comparative efficacy and safety, ligand selection for synovial cell types, and biomarker-driven early human trials are current research goals. These barriers could change nanoparticle-mediated precision delivery in RA therapy from systemic immunosuppression to targeted, tailored disease control.

Keywords: Rheumatoid arthritis, DMARD, Nanoparticle delivery, Targeted therapy, Theranostics.

Abstract Id: PCO/OP/23

ELUCIDATION OF MECHANISTIC PATHWAY OF PHYTOCONSTITUENTS MANAGEMENT OF NEPHROLITHIASIS

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Abstract
Urolithiasis, particularly calcium oxalate nephrolithiasis, remains a prevalent global urinary disorder with high recurrence. Current therapies primarily focus on symptomatic relief and surgical removal, often accompanied by adverse effects and high relapse rates. Medicinal plants such as Schleichera oleosa possess anti-inflammatory and antioxidant that may act on multiple molecular targets involved in stone formation. However, their pharmacological mechanism against urolithiasis remains poorly established at the network level.
To investigate the potential therapeutic mechanism of Schleichera oleosa extract against urolithiasis using a network pharmacology approach and identify key target genes and pathways.
Phytoconstituents of Schleichera oleosa were retrieved from available phytochemical databases and literature. Corresponding drug-like targets were predicted using Swiss Target Prediction and PubChem. Urolithiasis-associated genes were collected from gamecard's. Common diagram was identified via Venn diagram. It was constructed to identify overlapping drug–disease target genes. Protein–protein interaction (PPI) analysis of common targets was performed using the STRING database and analysis in Cytoscape identified the top 10 hub genes. GO and KEGG enrichment analyses were performed to determine key biological processes and pathways mediating anti-urolithic effects.
Several active phytoconstituents of Schleichera oleosa Extract showed strong associations with molecular targets linked to oxidative stress, inflammation, and crystal retention. Intersection analysis revealed core common genes between the plant and urolithiasis. PPI network construction through STRING displayed close connectivity among inflammation and fibrosis-related genes. Cytoscape analysis identified the top 10 genes, including (insert genes once finalized from your dataset—e.g., IL6, TNF, CASP3, ESR1, PPARG etc.). GO and KEGG enrichment indicated that Schleichera oleosa may exert anti-urolithic activity by regulating NF-κB signalling, cytokine interactions, oxidative stress responses, apoptosis, and renal fibrosis pathways.
This network pharmacology study suggests that Schleichera oleosa acts on multiple targets and pathways associated with crystal formation, inflammation, oxidative stress, and renal tubular damage. Identification of key hub genes and signalling pathways provides scientific evidence supporting its potential use as a multi-target Phyto therapeutic agent for urolithiasis**.**

Keywords: Schleichera, Urolithiasis, Network pharmacology, Cytoscape, Calcium oxalate

Abstract Id: PCO/0P/24

Graphene Oxide in Wound Healing: A Multifunctional Approach to Advanced Skin Regeneration

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Abstract
The management of chronic and non-healing wounds is a major clinical challenge. This situation increases the demand for better functional wound dressings. Graphene Oxide (GO) is a highly oxidized two-dimensional (2D) nanomaterial that has shown promise due to its unique combination of physical and biological properties. the application and mechanism of GO in speeding up the wound healing process. Its large surface area, strong mechanical properties, and

water-attracting nature make it a great addition to hydrogels, scaffolds, and electrospun fibers. This improves the strength of these dressings. Importantly, GO has natural antibacterial activity that works by disrupting the physical structure of membranes and generating oxidative stress. This helps reduce infection, which is a significant obstacle to healing. Moreover, studies show that GO influences the cellular environment. It promotes the adhesion, growth, and movement of essential skin cells, such as fibroblasts and keratinocytes. Its ability to absorb growth factors and affect reactive oxygen species (ROS) levels helps decrease inflammation and supports re-epithelialization and new blood vessel formation. In conclusion, Graphene Oxide and its composites offer a multifunctional approach that tackles infection control, mechanical support, and cellular stimulation. this position GO as an important material for the next generation of effective wound care technologies.

Keywords-Graffin oxide, Wound Healing, Nanoparticle, Antibiotic.

Abstract Id: PCO/OP/25

Treatment modalities for Anaphylaxis

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Abstract
Anaphylaxis is a sudden systemic reaction to hypersensitivity of any kind, that may result in a severe life-threatening condition that interferes with the airways, breathing passage and blood flow. The first things that need to be done are assessing the airway, eliminating the trigger if possible and giving adrenaline intramuscularly right away. Supportive therapies include high concentration oxygen therapy, intravenous volume for hypotension and second-line agents like antihistamines, corticosteroids and bronchodilators. In case of initial intervention failure refractory patients require advanced airway management systems proceeding with vasopressors or glucagon (ESP) in beta- blocked individuals. Anaphylaxis basic therapy is patient education; antigens avoidance; emergency action plans implementation and specific triggers potential immunotherapy. Early diagnosis as well as treatment are crucial factors which increase further recovery likelihood in anaphylaxis.
Keywords: Anaphylaxis, epinephrine, airway management, antihistamines, corticosteroids, intravenous fluids, bronchodilators, glucagon, immunotherapy.

Abstract Id: PCO/OP/26

Hope for Huntington's disease

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Abstract
Hope for Huntington's: Breakthrough Treatments and Promising Therapies Huntington's Disease (HD) is a progressive genetic disorder caused by a mutation in the HTT gene, leading to severe motor, cognitive, and emotional decline. Affecting around 30,000 individuals in India and over 200,000 worldwide, HD typically surfaces between the ages of 30 and 50.A historic breakthrough, AMT-130, is the first gene therapy to demonstrate a 75% reduction in disease progression over three years. This one-time surgical treatment targets messenger RNA, offering potential long-lasting benefits while avoiding permanent gene editing risks .The HD research landscape is rapidly evolving. Emerging therapies like Drugs PTG318, SKY-0515, and SAGE-718, along with AMT-101, are showing promise by reducing toxic proteins and improving cognition .Research progress is accelerating, with the HD research pipeline expanding by 40% in 2024. This involves over 35 active trials, 5,000+ participants, and 25 countries, alongside advancements in biomarkers, digital health tools, and patient engagement .Global collaboration is enhancing progress through international clinical trial networks and shared research databases. Community support and multidisciplinary care centers are also improving access and awareness. The Future Outlook is optimistic, with the first FDA approval of a

disease-modifying treatment anticipated by 2026. The focus is shifting towards early intervention, personalized gene therapy, and combination approaches .In conclusion, the synergy of scientific innovation and growing community support is transforming Huntington's disease from an untreatable condition to one filled with hope, progress, and possibility.

Keywords: Promising therapies , HTT Gen e,AMT-130, Active Trials ,Biomarkers , community support

Abstract Id: PCO/OP/27

Decoding Multiple Sclerosis: Unravelling the Mysteries of Autoimmune Neurodegeneration

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Abstract

The complicated immune-mediated neurodegenerative disease known as multiple sclerosis (MS) causes inflammation, demyelination, and axonal loss that impair the central nervous system's (CNS) ability to function normally. The illness is caused by an abnormal immunological reaction against myelin components, which impairs neural transmission and causes neurological deterioration over time. Genetic predisposition, environmental variables, and viral triggers are acknowledged as significant contributors to the onset of disease, even though the precise etiology is still unknown. Visual impairment, muscle weakness, balance issues, exhaustion, and cognitive failure are among the diverse clinical signs of multiple sclerosis. Neuroimaging, cerebrospinal fluid biomarkers, and electrophysiological investigations are used in diagnostic evaluation. Controlling inflammation, lowering the frequency of relapses, and delaying progression are the goals of current treatment approaches, especially disease-modifying treatments (DMTs). Promising insights into neuroprotection and remyelination are provided by recent developments in neuroimmunology and regenerative medicine, opening the door to individualized and therapeutic methods. Sustained investigation into the immunopathogenesis of multiple sclerosis is essential for creating novel and efficient treatments.

Keywords: Multiple sclerosis, autoimmune neurodegeneration, neuroinflammation, neuroprotection, immunopathology.

Abstract Id: PCO/OP/28

"Neuroprotective potential of proanthocyanidin against ischemic brain stroke"

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Abstract

Ischemic stroke results from diminished cerebral blood flow, leading to oxidative stress, inflammation, and neuronal damage. In this investigation, we used a rat model of cerebral inflammation caused by bilateral common carotid artery occlusion (BCCAO) to assess the neuroprotective effectiveness of proanthocyanidin. Proanthocyanidin was administered to rats exposed to BCCAO, and subsequent examinations of brain tissues evaluated antioxidant, biochemical, and histological changes. Proanthocyanidin significantly reduced malondialdehyde (MDA) levels while increasing glutathione (GSH) content and boosting superoxide dismutase (SOD) and catalase activity, according to antioxidant evaluations, indicating a potent attenuation of oxidative stress. Proanthocyanidin also reduced myeloperoxidase (MPO) and acetylcholinesterase (AChE) activity, according to biochemical tests, indicating a strong anti-inflammatory and neuroprotective impact. These results were corroborated by histopathological findings: treated mice showed lower microglial activation, fewer necrotic lesions, and intact neuronal architecture in hippocampus and cortical regions. Collectively, these results indicate that proanthocyanidin exerts a significant neuroprotective effect

via enhancement of endogenous antioxidant defence mechanisms and suppression of inflammatory responses. These results provide credence to the idea that proanthocyanidin could be a useful therapeutic approach to reduce ischemic stroke-related cerebral inflammation and neuronal damage.

Keywords: Proanthocyanidin, myeloperoxidase, acetylcholinesterase, oxidative stress, inflammation, neuroprotection, and antioxidant enzymes

Abstract Id: PCO/OP/29

An Integrated Conceptual Framework for Sleep Health Promotion

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Abstract
Background: Sleep is an essential biological process vital for physical health, mental wellbeing, and occupational performance. However, the rising global burden of sleep disturbances and their fragmented theoretical understanding limit the effectiveness of current interventions. Existing approaches often emphasize isolated biological or psychological factors, lacking an integrative framework to explain sleep behavior comprehensively. Objective: To develop a conceptual framework that integrates the Integrated Theory of Health Behavior Change (ITHBC) with a systems approach to explain the determinants of sleep behavior and its influence on work efficiency. Methods: A systematic synthesis of theoretical models and empirical evidence related to sleep health and behavior change was conducted. The key determinants of sleep biological, psychological, social, and environmental, were mapped within the ITHBC's three core constructs: knowledge and beliefs, self-regulation skills and abilities, and social facilitation. The systems approach was applied to capture the dynamic interconnections among these determinants, emphasizing continuous feedback and multilevel interactions influencing sleep outcomes. Framework Description: The proposed model conceptualizes healthy sleep as a proximal outcome influenced by multilevel factors operating through ITHBC domains within an ecological system. These domains interact dynamically to enhance knowledge, strengthen selfregulation, and foster social support, while the systems approach integrates biological, psychosocial, and environmental determinants to improve sleep quality. Enhanced sleep reduces fatigue, improves cognitive function, and thereby increases work efficiency, the distal outcome. Conclusion: This integrative framework offers a comprehensive, theory-driven model for promoting sleep health and work efficiency. It provides a structured basis for future research, intervention design, and policy formulation aimed at improving sleep-related outcomes in diverse populations.
Keywords: Integrated Theory of Health Behavior Change (ITHBC), Sleep health, Sleep promotion, System Approach.

Abstract Id: PCO/OP/30

Exploring natural defenses against oxidative stress

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Abstract

Free radicals generation occurs due to oxidative stress which is caused by various factors such as pollution , poor diet, and UV radiation. Prolonged oxidative stress may lead to various diseases like cancer, cardiovascular diseases , neurodegenerative, respiratory, autoimmune and kidney disorders. Although the body has an antioxidant defense system to combat oxidative stress but it may fail under chronic conditions. In such cases antioxidants-both natural and synthetic are required. This review focuses on natural antioxidants derived from plants , their phytochemistry, mechanisms of action, and assay methods used to evaluate the antioxidant potential. Major phytoconstituents responsible for antioxidant action are Phenolic acids , flavonoids, carotenoids , terpenoids, tannins, and alkaloids which exhibits strong radical-scavenging, metal-chelating, and lipid peroxidation inhibiting activities and modulates redox sensitive signaling pathways such as Keap1–Nrf2–ARE which enhances endogenous antioxidant enzyme expression.

In vitro assays like DPPH, ABTS, FRAP, and ORAC evaluate radical scavenging and reducing power, while in vivo studies use markers like MDA, SOD, CAT, and GSH to reflect oxidative stress and antioxidant defense in biological systems. This review emphasize the potential of natural antioxidants in promoting health and preventing oxidative stress induced diseases.

Keywords: Antioxidants ,Oxidative stress, free radicals, phenolic compounds, flavonoids, terpenoids, Redox signaling , Keap1-Nrf2-AREpathway, Antioxidant assays.

Abstract Id: PCO/OP/31

PROJECTIONS OF PERSONALIZED MEDICINE IN FUNGAL RHINOSINUSITIS

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Abstract

Personalized medicine (PM) is the new approach for treating various diseases on the basis of their individual genetic material. The genetic pool of different persons is influenced by their genes that directly affects the behavioral and psychological aspects of that person. In a seasonal condition, fungal rhinosinusitis phycology plays important role on the patient health and physiology. As the fungal rhinosinusitis is best treated by medicines, and surgery (in severe conditions). While a new approach has been assumed for the treatment of fungal rhinosinusitis which is done by targeting the genetic material of CRSwNP and CRSsNP with the help of different biomarkers. This manuscript highlights the role of CRSsNP and CRSwNP in the design of precision medicine with the help of different biomarkers. The review focused on the overview of fungal rhinosinusitis; a type of nasal fungal infection and their various types that were differentiate on the basis of invasive and non-invasive approach with their causative agents. Here, we also described various ways of diagnosis of fungal rhinosinusitis.

Keywords: Fungal Rhinosinusitis (FRS), Chronic rhinosinusitis without nasal polyps (CRSwNP) and Chronic rhinosinusitis with nasal polyps (CRSsNP), Computed Tomography (CT).

Abstract Id: PCO/OP/32

Therapeutic Promise of Melittin: Pharmacological Actions, Mechanisms, and Delivery Innovations

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Abstract

Melittin, the principal bioactive peptide of Apis mellifera venom, is a 26-residue cationic, amphipathic α-helical molecule that has emerged as a versatile membrane-active lead. Preclinical evidence attributes to melittin potent anticancer, broad-spectrum antimicrobial (antiviral, antibacterial, antifungal), anti-inflammatory, anti-rheumatic, and wound-healing effects, positioning it at the interface of therapy and drug delivery. Against enveloped viruses such as HSV, influenza, and HIV, melittin disrupts the lipid envelope and impedes entry. In fungi, notably Candida spp., it rapidly permeabilizes membranes and triggers mitochondrial dysfunction, yielding multitarget cytotoxicity. Anti-inflammatory activity arises from suppression of pro-inflammatory cytokines and NF-κB signaling, aligning with benefits in immune-mediated disorders. For wounds, topical and hydrogel delivery concentrates drug at lesions, enhancing re-epithelialization and antibacterial control while limiting systemic exposure. Mechanistically, melittin binds lipid bilayers, adopts an amphipathic helix, and at threshold peptide-to-lipid ratios forms transient pores that collapse ionic homeostasis and lyse cells. In tumors, it promotes mitochondrial apoptosis via cytochrome-c release and caspase activation, downregulates PI3K/Akt and NF-κB, and upregulates p53/p21. Systemic use is constrained by dose-limiting hemolysis and off-target cytotoxicity, motivating targeted delivery. Liposomes, PEGylated PLGA nanoparticles, and micelles reduce hemolysis, increase stability, and improve in vivo tumor selectivity. Future work is advancing blood–brain barrier-targeted liposomes, aptamer/antibody conjugates for on-demand activation, and pH- or protease-responsive carriers exploiting tumor acidity and MMP activity. Translational progress will require AI-guided PBPK modeling, rational co-delivery (e.g., EGCG or immune effectors), dose optimization, and rigorous hemocompatibility. Standardized hemolysis/complement assays, efficacy confirmation in orthotopic resistant models, and scalable manufacturing are critical to move melittin from molecule to medicine toward safe, first-in-human evaluation studies.

Keywords- Bee Venom, Melittin, Apis Mellifera, Western Honey Bee, Anti-Inflammatory Activity

Abstract Id: PCO/OP-33

Decoding Diabetic Retinopathy: Mechanistic Pathways, Risk Factors, and Modern Management Strategies

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Abstract

Diabetic retinopathy is a major complication associated with diabetes mellitus, resulting in visual impairment and blindness. It is the leading cause of visual impairment among working age adults resulting in substantial economic and healthcare burdens. This study explores the epidemiology and pathophysiology of Diabetic retinopathy, highlighting the global variation in its prevalence and the associated systemic risk factors. The pathophysiology of Diabetic retinopathy is characterized by intricate interactions among metabolic, hemodynamic, and inflammatory pathways, which include the activation of the polyol pathway, the accumulation of advanced glycation end products, the overactivation of protein kinase C, dysregulation of the renin–angiotensin–aldosterone system, and retinal neurodegeneration. This study explores the epidemiology and pathophysiology of Diabetic retinopathy, highlighting the global variation in its prevalence and the associated systemic risk factors. In this study, current screening methods and their implications such as anti-vascular endothelial growth factor (VEGF) therapy, laser treatment, surgical procedures and cutting-edge gene and stem cell therapies. In conclusion, emphasizing the need for efficient and scalable approaches while underlining their limitations and potential side effects for diabetic retinopathy. It highlights the potential role of cytokines and growth factors as treatment targets and emphasizes the importance of glycemic control and management of systemic risk factors in mitigating the impact of this vision-threatening complication of diabetes. It serves as a comprehensive resource for understanding the challenges posed by diabetic retinopathy and the need for innovative strategies to address this growing public health concern.

Keywords: Diabetic retinopathy, Metabolic disease, Vascular Endothelial Growth Factor, Cytokines, Glycemic control.

Abstract Id: PCO/OP/34

Approaches for Management and Therapeutic Intervention of Non-Alcoholic Fatty Liver Disease (NAFLD): A comprehensive Review

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Abstract:
The non-alcoholic fatty liver disease (NAFLD) has evolved into most prevailing chronic liver disorder globally and estimated to be major cause of liver transplantation by 2030 with and approximate global prevalence between 25%-30%. NAFLD is characterized by uncontrolled hepatic fat accumulation in absence of marked alcohol intake. NAFLD comprises a spectrum extending from simple steatosis to non-alcoholic steatohepatitis (NASH), fibrosis, cirrhosis and hepatocellular carcinoma. Its pathogenesis is explained by multiple-hit hypothesis, involving insulin resistance (IR), lipotoxicity, inflammation and endoplasmic reticulum (ER) stress. Disrupted insulin signaling enhances adipose lipolysis and free fatty acid influx to the liver amplifying steatosis and promoting IR. Nuclear receptors such as peroxisome proliferator-activated receptor--α (PPAR-α) and thyroid hormone receptor-β (TRβ) suppresses these mechanisms by promoting β-oxidation, improving mitochondrial function and reducing hepatic triglyceride accumulation. In parallel, ER chaperone BiP (GRP78) regulates protein folding and unfolding protein response (UPR); its disruption induces NLRP3 inflammasome activation and caspase-1 dependent pyroptosis, fueling hepatic inflammation and fibrosis. Pharmacological modulation of PPAR-α and TRβ signaling, along with suppression of BiP-caspase-1-driven ER stress, shows therapeutic potential to reverse lipid accumulation, oxidative injury and hepatocellular death. Modulating these integrated metabolic and inflammatory pathways provides an effective approach limiting NAFLD progression and prevents its transition to end-stage liver disease.

Keywords: BiP, Caspase-1, ER stress, Fibrosis Insulin resistance, Hepatic inflammation, NAFLD, NASH, PPAR-α, TRβ.

Abstract Id: PCO/OP/35

Adaptive Clinical Trial Designs: Transforming Drug Development Efficiency and Ethics

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Abstract
Clinical trials have traditionally relied on rigid, fixed protocols that often constrain flexibility, escalate costs, and prolong drug development timelines. In recent years, adaptive clinical trial designs have emerged as a transformative framework, allowing pre-planned modifications to trial parameters based on accumulating interim data without compromising statistical integrity or regulatory compliance. This review explores the evolution, methodology, and ethical considerations of adaptive designs, including Bayesian, group-sequential, response-adaptive randomization, and platform trial approaches. We discuss how these models enhance trial efficiency, optimize resource utilization, and improve patient safety through data-driven decision-making. Special attention is given to regulatory perspectives from agencies such as the U.S. Food and Drug Administration (FDA) and European Medicines Agency (EMA), as well as to statistical challenges in maintaining type I error control and interpretability. The growing integration of artificial intelligence, machine learning, and real-world evidence further expands the adaptive design paradigm, enabling more patient-centered and cost-effective clinical research. Overall, adaptive trial designs signify a paradigm shift toward a more flexible, efficient, and ethically grounded drug development ecosystem.

Keywords Adaptive clinical trial design; Bayesian methods; response-adaptive randomization; platform trials; drug development; real-world evidence; artificial intelligence; regulatory science; clinical research ethics.

Abstract Id: PCO/OP/36

3D Printing: A Futuristic Innovation in Drug Development and Delivery

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Abstract:
Three-dimensional (3D) printing, also known as additive manufacturing, is revolutionizing the pharmaceutical field by enabling the design and fabrication of highly precise and personalized drug delivery systems. Unlike conventional manufacturing, 3D printing allows layer-by-layer construction of dosage forms with customized doses, shapes, and release profiles tailored to individual patient needs. This innovative approach integrated computer-aided design with pharmaceutical formulation, offering exceptional flexibility in developing complex
and multi-drug systems. Various 3D printing techniques—such as inkjet printing, fused deposition modelling (FDM), stereolithography, and selective laser sintering—have demonstrated potential in drug manufacturing.
Among these, inkjet printing has gained prominence due to its precision in dispensing minute quantities of drug solutions, particularly beneficial for heat-sensitive or low-dose formulations. The landmark approval of Spritam® (levetiracetam) by the U.S. FDA as the first 3D-printed tablet exemplifies the clinical translation of this technology. Despite challenges such as scalability, regulatory barriers, and formulation stability, continuous research efforts are advancing printable materials and optimizing printing parameters for improved quality and efficiency. Overall, 3D printing holds immense promise in the future of pharmaceutical development by paving the way for on-demand production and patient-centric therapy, thereby transforming traditional drug delivery paradigms.

Keywords: 3D printing, drug delivery, pharmaceutics, personalized medicine, additive manufacturing

Abstract Id: PCO/OP/37

AI-Integrated Computer-Aided Drug Design for Enhancing the Anticancer Potential of Drugs Combined with Bioactive Agents: An Overview

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Abstract
Background: Cancer treatment faces major challenges such as drug resistance and adverse side effects, highlighting the need for safer and more effective approaches. Natural bioactive compounds have shown significant potential in targeting multiple pathways involved in cancer progression. This study used Artificial Intelligence (AI)–integrated Computer-Aided Drug Design (CADD) to explore how bioactive compounds can work synergistically with targeted anticancer drugs to improve therapeutic outcomes.

Objective: To investigate how bioactive agents interact with key cancer targets and evaluate how AI-assisted CADD can enhance the prediction and design of effective drug combinations.
Methodology: AI-based molecular docking and dynamics simulations were used to study the binding and stability of bioactive agents with cancer targets such as EGFR, VEGFR, PI3K/Akt, mTOR, Bcl-2, and NF-κB. Deep learning–

based ADMET and QSAR models predicted pharmacokinetic and toxicity properties, while AI-driven network pharmacology identified key signaling pathways influenced by these compounds.

Results & Conclusion: Bioactive agents showed strong and stable interactions with multiple targets, along with favorable pharmacological profiles. Network analysis revealed modulation of tumor growth, apoptosis, and angiogenesis pathways, suggesting potential to overcome drug resistance. AI-integrated CADD thus offers a promising approach for designing safer, multi-target anticancer therapies and guiding future experimental validation.

Keywords: AI, CADD, bioactive agents, cancer therapy, molecular docking, ADMET, QSAR.

Abstract Id: PCO/OP/38

Evolving Frontiers in Tuberculosis Therapy: A Market Survey of Third- Generation Treatments

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Abstract

Tuberculosis (TB) remains a leading infectious disease worldwide despite the availability of several generations of anti-tubercular therapies. The global rise of multidrug-resistant (MDR- TB) and extensively drug-resistant (XDR-TB) strains has necessitated the development and market introduction of third-generation treatments that aim to overcome limitations of conventional regimens. This market survey explores the landscape of currently available third-generation TB treatments, including newer drug entities such as bedaquiline, delamanid, and pretomanid, as well as combination regimens like BPaL (bedaquiline, pretomanid, and linezolid) and BPaLM (bedaquiline, pretomanid, linezolid, and moxifloxacin). Data were collected through analysis of recent WHO reports, clinical trial registries, pharmaceutical databases, and commercial market insights. The findings reveal a growing market demand for shorter, more effective, and patient-compliant therapies, driven by global health initiatives and increasing public-private collaborations. However, challenges persist in terms of accessibility, affordability, and regulatory approvals, especially in low- and middle-income countries with high TB burdens. The global TB therapeutics market, currently valued at over USD 1.2 billion, is projected to grow steadily as adoption of third-generation regimens increases. Bedaquiline-based combinations dominate the current landscape due to their superior efficacy and lower resistance potential. In conclusion, the third-generation TB treatment market reflects a promising shift toward innovation, with a focus on novel mechanisms of action, reduced toxicity, and improved adherence. Continued investment in research, cost reduction, and equitable distribution will be critical for achieving the WHO End TB Strategy by 2035.

Keywords: Tuberculosis (TB); third-generation drugs; MDR-TB; XDR-TB; bedaquiline; delamanid; pretomanid; BPaL regimen; BPaLM regimen; anti-tubercular therapy; WHO End TB Strategy; drug resistance; pharmaceutical market trends.

Abstract Id: PCO/OP/39

Ameliorative Role of Novel Pharmacological Intervention Against Cadmium Chloride Induced Neurotoxicity

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Abstract

Cadmium is an extremely toxic heavy metal that enters the human body through industrial pollution, contaminated water, food, smoking, and waste. Exposure to cadmium chloride is highly neurotoxic in the brain and nervous system, leading to impaired cognitive behaviors and structural changes. One major mechanism of $CdCl_2$ involves excessive production of reactive oxygen species (ROS), leading to damage in lipids, proteins, and DNA in the hippocampus, cortex, and cerebellum. This results in neurodegeneration and manifests as memory loss, anxiety, and depression.Cadmium also blocks calcium channels, thereby interfering with neurotransmitter release and damaging the blood-brain barrier to allow the entry of toxicants into brain tissue. The diminution of antioxidants like glutathione

(GSH) and enzymes such as SOD, CAT, and GPx further heightens oxidative damage. Besides, neuroinflammation plays a central role in cadmium-induced toxicity because cadmium activates microglia and astrocytes, enhancing the release of cytokines like TNF-α, IL-1β, and IL-6. These inflammatory mediators enhance neuronal death through MAPK, NF-κB, and caspase signaling pathways.

$CdCl_2$ exposure also exerts its effects on hippocampal neurons through decreased dendritic spine density and impaired synaptic transmission, thereby affecting learning and memory. Several antioxidants-Vitamin E, vitamin C, N-acetylcysteine, and melatonin-have shown potential neuroprotective effects against cadmium-induced damage.

In summary, $CdCl_2$-induced neurotoxicity results from oxidative stress, inflammation, calcium imbalance, and apoptosis, leading to severe neuronal dysfunction. Understanding these mechanisms helps develop effective protective strategies, emphasizing the need for further research, public awareness, and environmental control to prevent this growing neurotoxic threat.

Abstract Id: PCO/OP/40

From Molecular Insights to Clinical Translation: Regulatory and Developmental Advances in Stem Cell Therapy for Neurodegenerative diseases

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Abstract

Neurodegenerative disorders, such as Huntington's disease, Parkinson's disease, and amyotrophic lateral sclerosis, represent a growing global health challenge, with limited disease modifying treatments currently available. Stem cell-based therapies have emerged as a viable treatment modality, providing options for neuroprotection, neuronal replacement, and pathological microenvironment modification. Despite extensive preclinical evidence for functional recovery and increased longevity in animal models, successful clinical translation remains a hurdle. This work considers the translational pathway comprising molecular mechanisms, preclinical validation, and early-phase clinical research. It also considers how new regulatory frameworks affect the development, approval, and post-marketing supervision of stem cell-based medicines. The main translational challenges include the inability to predict the source and characteristics of cells, the variability in animal models, problems with drug development that is potent, scalable, and genetically stable, and toxicology concerns such as tumorigenicity and immunological compatibility. Clinical trial design also presents unique challenges for advanced pharmaceuticals, including the need for adaptive methodologies, extended safety surveillance, and harmonized global regulatory standards. To promote innovation while ensuring patient safety, regulatory agencies including the FDA, EMA, and PMDA have established accelerated pathways along with risk-based classifications: RMAT, ATMP, Sakigake. Such improvements emphasize the critical role of regulatory science in translating laboratory discoveries into clinically meaningful therapeutic outcomes. This study highlights how translational research, development of regulations, and technical advances together shape the future of the use of stem cells to treat neurodegenerative diseases. It is important to understand these interrelated pathways in order to translate early molecular findings into treatments that are relevant clinically and lifesaving.

Keywords: Stem cell therapy; neurodegenerative diseases; clinical translation; regulatory science; ATMP; RMAT designation; PMDA; FDA; EMA; translational challenges; advanced therapies.

Abstract Id: PCO/OP/41

Neuroinflammation in Depression and its Pharmacology Modulation

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Abstract:
Neuroinflammation is significantly implicated in the pathogenesis and depressive disorder. Heightened systemic inflammation correlates with diminished antidepressant response and unfavourable prognoses. Novel anti-inflammatory interventions may benefit individuals with depression and immune dysregulation. Employing inflammatory markers can aid in identifying patients exhibiting inflammation and potential resistance to conventional therapies, thereby facilitating optimized treatment strategies. This review elucidates the influence of neuroinflammation on major depressive disorder and proposes alternative inflammation-targeted treatments, such as electroconvulsive therapy and ketamine. It also examines the utility of inflammatory markers in mitigating treatment resistance and refining therapeutic approaches. Neuroinflammation encompasses non-neuronal cells that can compromise nerve function, precipitating depressive symptomatology. The concept of induced inflammation in animal models has spurred inquiries into the activation mechanisms of immune cells within the brain. Contemporary research indicates microglia activation in depression, yet the clinical implications remain ambiguous. The processes underlying brain inflammation associated with depression. This mini-review will address recent discoveries regarding neuroinflammatory mechanisms in experimental depression models, the complexities of replicating depression in laboratory animals, and the therapeutic potential of targeting neuroinflammation for depressive disorders.

Keywords: Depression, Neuroinflammation, Cytokines, Immune cells, Experimental models and Microglia

Abstract Id: PCO/OP/42

Phytotherapeutic Modulation of MMPs, NF-κB, and Oxidative Pathways in the Pathophysiology of Varicose Veins: An Integrative Review

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Abstract
Varicose veins are a common manifestation of chronic venous disorders (CVDs), which are characterized by structural alterations in the venous wall, impaired blood flow, and valvular dysfunction. The principal mechanisms involve leukocyte adhesion to the endothelium, endothelial injury, increased venous pressure, and inflammation. Together, these factors promote overexpression of matrix metalloproteinases (MMP-2 and MMP-9) and degradation of the extracellular matrix (ECM). An imbalance between MMPs and their tissue inhibitors (TIMPs) contributes to venous dilation and reduced elasticity. Oxidative stress and hypoxia further exacerbate this pathology by activating nuclear factor-κB (NF-κB) and hypoxia- inducible factors (HIF-1α and HIF-2α), which upregulate pro-inflammatory cytokines and MMP expression. Reactive oxygen species (ROS) sustain a cycle of endothelial dysfunction, inflammation, and progressive venous wall degeneration. Conventional therapies-such as compression, sclerotherapy, and surgical or endovenous ablation—alleviate symptoms but do not target these molecular pathways. Phytoconstituents including flavonoids, triterpenoids, and essential oils exhibit antioxidant, anti-inflammatory, and venoprotective properties by inhibiting MMPs, suppressing NF-κB signaling, and restoring endothelial integrity. Promising evidence from Aesculus hippocastanum, Centella asiatica, Ruscus aculeatus, Camellia sinensis, Curcuma longa, and Vitis vinifera supports the therapeutic potential of these agents. Collectively, phytotherapeutic modulation of oxidative and proteolytic signaling represents a scientifically grounded, multitarget strategy for the adjunctive management of varicose veins.

Keywords: Varicose veins; chronic venous disease; matrix metalloproteinases; NF-κB; oxidative stress, phytotherapy; endothelial dysfunction; flavonoids; triterpenoids.

Abstract Id: PCO/OP/43

Comparative Evaluation of Induction Models of Diabetes: Mechanistic Insights and Translational Relevance for Preclinical Research

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Abstract:
Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from impaired insulin secretion, insulin action, or both. Experimental induction models of diabetes play a pivotal role in elucidating disease mechanisms, identifying therapeutic targets, and evaluating novel antidiabetic agents. This study provides a comprehensive overview of the most widely employed induction models, including chemically induced (Streptozotocin and Alloxan), dietary-induced (high-fat and high-sucrose diets), and genetic models (db/db and ob/ob mice), emphasizing their mechanistic pathways, reproducibility, and clinical relevance. Chemically induced models mimic pancreatic β-cell destruction, whereas dietary and genetic models more accurately represent insulin resistance and Type 2 diabetes pathophysiology. The selection of an appropriate model depends on the research objective, species sensitivity, and duration of study. Moreover, recent advancements in hybrid and transgenic models have enhanced the translational predictability of preclinical studies. Understanding the strengths and limitations of each induction approach is crucial for optimizing experimental design and minimizing variability in outcomes. This paper highlights the importance of standardizing induction protocols and integrating molecular biomarkers to ensure greater alignment between preclinical findings and clinical manifestations of diabetes.

Keywords: Diabetes mellitus, induction models, Streptozotocin, Alloxan, insulin resistance, animal models, preclinical research, β-cell destruction, translational relevance, metabolic disorders.

Abstract Id: PCO/OP/44

Nanocarriers as a promising approach in the treatment of Diabetic foot ulcers

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Abstract
A Diabetic Foot Ulcer (DFU) is characterized by delayed wound healing, poor vascularization, and persistent inflammation. About 15% of people who are diabetic will eventually get DFU, and 14%–24% of them will need to have their ulcerated foot amputated because of infection of the bones or other ulcer-related problems. The three pathologic processes that underly DFU are neuropathy, vascular insufficiency, as well as subsequent infection brought on by foot trauma. Conventional therapies usually fail to deliver drugs to the target site, but nanocarrier-based therapies are showing promising alternatives, offering targeted delivery, enhanced healing, and multifunctional effects. Innovative methods based on nanomaterials possess enormous potential for both preventing and treating bacterial wound infections. Liposomes, polymeric nanoparticles, dendrimers, and nanogels are examples of nanocarriers that provide site-specific and prolonged drug delivery, improved drug penetration, and degradation protection for encapsulated bioactives. Additionally, one or more therapeutic drug molecules, such as growth factors, nucleic acids, antioxidants, and antibiotics, can also be delivered through nanocarriers and released in the target tissue over time. The current nanocarrier based methodologies have future therapeutic approaches for wound healing strategies in the treatment of diabetic wounds. However, extensive clinical trials and long-term safety assessments are required to establish standardized nanocarrier systems for routine clinical use.

Keywords: Nanocarriers; Diabetic foot ulcers; Targeted drug delivery; Wound healing; Nanotechnology-based therapies.

Abstract Id: PCO/OP/45

Signal Detection and Risk Assessment of Depression-Inducing Drugs Through Computational Pharmacovigilance

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Abstract

Drug-induced depression represents a significant yet underrecognized adverse drug reaction that affects patient quality of life and treatment adherence. With the proliferation of pharmacovigilance databases and advances in computational methodologies, researchers now have unprecedented opportunities to identify, quantify, and predict depression-inducing potential across therapeutic classes. This review synthesizes current computational approaches applied to pharmacovigilance data for detecting and analyzing depression-inducing drugs, including signal detection algorithms, machine learning techniques, network pharmacology, and natural language processing. We examine major pharmacovigilance databases, discuss methodological challenges, and highlight therapeutic classes most commonly associated with drug-induced depression. Future directions emphasizing artificial intelligence integration, multi-modal data fusion, and personalized risk prediction are also explored.

Keywords: Drug-induced depression, pharmacovigilance, data mining, machine learning, adverse drug reactions, signal detection, bioinformatics.

Abstract Id: PCO/OP/46

Modern trends in nano-herbal therapies for neurodegenerative disorders

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Abstract

Neurodegenerative diseases such as Alzheimer's and Parkinson's are characterized by neuronal loss, oxidative stress, neuroinflammation, and impaired neurotransmission. Conventional therapies provide only limited symptomatic relief, largely due to poor penetration of the blood–brain barrier (BBB). Recent advances in phyto-nanoformulations nano-engineered carriers for plant-derived bioactive compounds offer a promising therapeutic
strategy. These formulations can enhance antioxidant defences, reduce inflammation, inhibit protein aggregation, and improve mitochondrial function. Moreover, they significantly enhance the solubility, stability, bioavailability, and targeted delivery of phytochemicals such as curcumin, resveratrol, quercetin, and ginkgo extract. Through green nanotechnology, biocompatible and controlled-release systems have been developed that promote cellular uptake while minimizing toxicity. Although preclinical studies show encouraging results, further clinical research is essential to establish the long-term efficacy, safety, and translational potential of phyto-nanoformulations as disease-modifying therapies for neurodegenerative disorders.

Keywords: phyto-nanoformulations, neurodegenerative diseases, nanoparticles, phytochemical, neuroprotection, oxidative stress.

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Pharmaceutical Chemistry
Poster Presentation

Abstract Id: PCHE/PP-01

Design and synthesis of new N, N'-disubstituted thiocarbamide ligands and their mononuclear copper (I) complexes as potential anticancer agents: From in vitro cytotoxicity screening, DNA damage to apoptosis analysis.

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The great success achieved with platinum based antitumor drugs, mainly including cisplatin; carboplatin and oxaliplatin have promoted the development of metal-based drugs. However, several side effects associated with these drugs stimulated researchers to develop more effective, less toxic and target specific anticancer drugs. Therefore, numerous transition metal complexes with a variety of ligands have been synthesized and tested for their cytotoxicity. Amongst these, anticancer properties of transition metal complexes of N, N-disubstituted and N, N'-disubstituted thiocarbamides have attracted considerable interest. Though copper is bio-essential element responsible for numerous bioactivities in living organisms, a little has been published about the antineoplastic activity of copper complexes with substituted thiocarbamides. Since varying substituents is a common method for drug design in medicinal chemistry, we have synthesized a series of substituted thiocarbamide derivatives having different substituents on both the nitrogens of thiocarbamide core and also their copper (I) complexes. All these compounds have been tested for their in vitro cytotoxicity against two human cervical cancer cell lines (2008 and C13*) and three human ovarian carcinoma cell lines (A2780, A2780/CP and IGROV-1). DNA damage and G_0/G_1 cell cycle arrest analysis have also been performed on most potent copper (I) complexes.

Keywords: Thiocarbamides, in vitro cytotoxicity, DNA damage and cell cycle arrest analysis.

Abstract Id: PCHE/PP-02

AI Meets TB: Designing Next-Generation Peptide Therapeutics

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Abstract:
Tuberculosis (TB) treatment remains a leading cause of death worldwide and is becoming more difficult due to the rise of multidrug-resistant strains. Mycobacterium tuberculosis is the causative agent of tuberculosis, an infectious disease that primarily affects the lungs but can spread to other organs. This work involves developing novel peptide-based therapies for Mycobacterium tuberculosis, utilizing artificial intelligence (AI) in drug discovery. To identify suitable peptide sequences that can bind to essential TB target proteins, Artificial intelligence is used to analyse huge datasets. AI models can discover new therapeutic peptides more quickly and precisely by learning from known peptide–protein interactions. Molecular docking and dynamics simulations were used to test a few peptides in order

to verify their stability. To predict the binding affinity of peptides and their key interactions with the target proteins of Mycobacterium tuberculosis, molecular docking was employed. The peptide–protein interactions, stability, and flexibility under physiological conditions were then assessed using molecular dynamics simulations. the study demonstrates how AI can speed up the discovery of effective, targeted anti-TB peptides, paving the way for next-generation therapies.

Keywords: Mycobacterium tuberculosis, tuberculosis, multidrug resistant, peptide-based therapies, artificial intelligence, drug discovery, molecular docking.

Abstract Id: PCHE/PP-03

Computational Drug Design: An innovative idea to develop the drug

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Abstract

Computational drug design, also known as Computer - Aided Drug Design (CADD), is the use of computer programs and analysis to identify, optimize and develop potential new drug. The main focus is to speed up the drug discovery process, improve accuracy, and reduce the time and financial resources needed, ultimately making a positive impact on public health. A comprehensive literature was conducted using databases such as PubMed and Scopus, focusing on studies published till 2024. The selection of studies was based on their analysis of the connection between contemporary pharmaceutical research and computer-aided drug design, with a focus on both structure-based and ligand-based drug design strategies can include molecular docking, fragment-based drug discovery, de novo drug design, pharmacophore modelling, Quantitative structure-activity relationship, 3D-QSAR, homology modelling, predicts absorption–distribution– metabolism–excretion–toxicity, and machine learning. To change from Random screening against disease assays. Natural products, synthetic chemicals. Rational drug design and testing, speed-up screening process, efficient screening (focused), integration of testing into design process and fail drug fast (remove hopeless ones as early as possible).

Keywords: Drug Discovery, using databases, drug design and PubMed,

Abstract Id: PCHE/PP-04

Machine Learning and Deep Learning in Drug Design: Emerging Trends and Applications

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Abstract

Artificial Intelligence is the branch of computer science concerned with the emulation of human cognitive processes by computer and it relates to the implementation of automatic algorithms, machine learning, and technologies in many pharmaceutical areas. It is a versatile tool used in various circumstances. Drug designing and development is an important area of research for pharmaceutical companies and chemical scientists. Artificial intelligence and machine learning technology play a crucial role in drug discovery and development. Machine learning and deep learning algorithms have been implemented in several drug discovery processes such as peptide synthesis, structure-based virtual screening, ligand-based virtual screening, toxicity prediction, drug monitoring and release, pharmacophore modelling, quantitative structure-activity relationship, drug repositioning, polypharmacology, and physiochemical activity. The primary concern associated with drug design and development is time consumption and production cost. Further, inefficiency, inaccurate target delivery, and inappropriate dosage are other hurdles that inhibit the process of drug delivery and development. With advancements in technology, computer-aided drug design integrating artificial

intelligence algorithms can eliminate the challenges and hurdles of traditional drug design and development. Deep learning describes a class of machine learning algorithms that are capable of combining raw inputs into layers of intermediate features. These algorithms have recently shown impressive results across a variety of domains. AI in future will be widely used in healthcare delivery, and there is enormous potential for both cost reduction and service quality enhancement.

Keywords: Artificial Intelligence, Machine learning, Virtual Screening, Target Identification.

Abstract Id: PCHE/PP-05

Multi-Target Therapeutics in complex Disorders using in silico approaches

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Abstract

The increasing global prevalence of complex disorders, such as cancer, neuro degenerative disorders, and diabetes are often characterized by multi-factorial etiologies, continues to place significant pressure on pharmaceutical industries and drug discovery platforms. Drugs that act on a single target have frequently proven impractical and insufficient for managing these complex conditions due to the complex network of biochemical pathways and multiple receptors involved in disease pathogenesis. In contrast, multi-targeting approaches that incorporate computational drug discovery approaches have revolutionized this field by enabling rational design, target prediction, and virtual screening of potential multi-target compounds with high efficiency and reduced cost. This approach can reduce the likelihood of drug resistance, minimize the need for polypharmacy, and enhance overall treatment efficacy. The combination of computational strategies with experimental validation provides a roadmap to facilitate the development of effective multi-target therapeutics. In this study, we performed in silico molecular docking to evaluate the multitarget potential of selected herbal molecules library from plants including standard drug. Main enzymatic targets implicated in glucose homeostasis and diabetes pathology, such as dipeptidyl peptidase-4 (DPP-4), α-amylase, and alpha glucosidase were used as a target for screening the potential ligands. Docking analyses were performed for each drug-target pair, and results were evaluated based on binding energies, hydrogen bonding, hydrophobic interactions, and other non-covalent interactions. The study revealed that certain compounds exhibited significant binding energies and stable interactions across multiple targets. Hypercin and Rutin were found to be have highest binding energies with three targets of diabetes making stable interactions at the binding sites of respective targets. These findings can guide future experimental studies and the rational design of novel multitarget antidiabetic therapies.

Keywords: Molecular Docking, α-amylase, DDP-4 and Rutin.

Abstract Id: PCHE/PP-06

Isatin as therapeutics of interest in microbial infections

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Abstract

Novel chemotherapeutic drugs that can fight multidrug-resistant bacteria are desperately needed due to the fast growth of antimicrobial resistance (AMR). As a favored scaffold in medicinal chemistry, Isatin (1H-indole-2,3-dione), a naturally occurring indole derivative present in plants, microbes, and mammalian metabolic pathways, has garnered significant interest. Isatin is a crucial pharmacophore for the creation of broad-spectrum antibacterial medicines because of its adaptable chemical structure and ease of structural alteration at several reactive locations. The

therapeutic potential of Isatin and its derivatives against bacterial, fungal, viral, and micro bacterial diseases is well highlighted in this study. Schiff bases, Mannich bases, thiosemicarbazones, azole, furan, sulfonamide, fluoroquinolone, chalcone, and coumarin conjugates are among the many Isatin-based hybrids and analogs that show strong and specific antimicrobial action. According to mechanistic investigations, these compounds function via a variety of mechanisms, including biofilm suppression, membrane disruption, interference with DNA gyrase and topoisomerase IV, inhibition of cell-wall production, and targeting vital enzymes like FtsZ and CrtM. In order to improve biological potency and overcome drug resistance, electronic substituents, linker flexibility, and hybridization techniques are crucial, according to structure-activity relationship (SAR) studies. The translational success of this scaffold is demonstrated by the clinical approval of many Isatin-based medications, such as sunitinib and nintedanib, for the treatment of cancer, while additional medications, such as TD-1792 and Ro 23-9424, are being evaluated for the treatment of infectious diseases. This review provides a comprehensive overview of Isatin-based antimicrobial research, highlighting key advancements, mechanisms, and therapeutic potential.

Keywords: Isatin derivatives, Anti-microbial activity, Drug resistance, Structure–activity relationship (SAR)

Abstract Id: PCHE/PP-07

NMR Spectroscopy for Detecting Milk Adulteration and Ensuring Quality

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Abstract

Milk is widely consumed globally, making it prone to intentional adulteration for financial gain. Conventional analytical methods often lack the sensitivity and specificity to detect a variety of adulterants in complex milk matrices. Nuclear magnetic resonance (NMR) spectroscopy offers areliable, non-destructive approach for identifying chemical adulterants in milk. To evaluate the role of NMR spectroscopy in milk analysis, focusing on compositional assessment, quality control, and detection of adulterants. Milk samples were analyzed using ^{1}H-NMR and 2D-NMR to profile metabolites. Chemometric techniques, including PCA and PLS-DA, were applied for classification and adulterant identification. High-resolution NMR detected key biomarkers, while low-field TD-NMR enabled rapid, non-destructive quality checks. Spiking experiments with common adulterants validated detection sensitivity. NMR successfully identified adulterants such as melamine, urea, sucrose, whey, and soy milk, with detection limits as low as 0.005%. Subtle metabolite fingerprints, including citrate, lactose, N-acetyl carbohydrates, allowed accurate differentiation of pure and adulterated milk. High- resolution NMR provided detailed compositional information, while low-field instruments enabled quick, real-time quality assessment.NMR is a powerful and versatile tool for detecting milk adulteration. It reliably identifies even trace adulterants and differentiates genuine from counterfeit milk using natural metabolite markers. Its combination of detailed high-resolution profiling and rapid low-field analysis makes it a practical technique for maintaining milk quality and authenticity.

Keywords: NMR; milk adulteration; authenticity; metabolite markers; quality control.

Abstract Id: PCHE/PP/08

In silico Design and Development of HMG Co-A Reductase Enzyme Targeted Scaffolds as Antihyperlipidaemia Agents

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Abstract

Hyperlipidaemia remains a significant global health concern and major risk factor for atherosclerosis and cardiovascular diseases. The enzyme 3-hydroxy-3-methylglutaryl-CoA (HMG-CoA) reductase is a prime therapeutic target since it is essential to the manufacture of cholesterol. Despite the fact that statins have transformed lipid-lowering treatment, new chemical scaffolds must be found due to their safety and tolerability issues. Herbal remedies for hyperlipidaemia give rise to ethical questions. Therefore, before executing animal research and human clinical trials, in silico studies are required to assess the safety and effectiveness of phytoconstituents. This research thoroughly examines computational approaches utilised in the logical design of possible antihyperlipidemic medicines, such as molecular docking, pharmacophore modelling, molecular dynamics simulations, structure-based and ligand-based drug design and ADMET profiling. The study's objective is to use molecular docking to assess natural products against hyperlipidaemia. The Protein Data Bank provided the protein's crystal structure (PDB ID: 1HW9). Docking tests for natural products against the 1HW9 protein were conducted using chimaera all things considered, this study highlights the significance of computational drug design as a catalyst for the development of novel and safer antihyperlipidemic drugs that target HMG-CoA reductase.

Keywords: HMG-CoA reductase, molecular docking, artificial intelligence, *in silico* design, hyperlipidaemia, and statin substitutes.

Abstract Id: PCHE/PP/09

Design and Molecular Docking of Carbazole Derivatives as Potential EGFR-Targeted Anticancer Agents

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Abstract

Carbazole derivatives have drawn considerable attention in medicinal chemistry because of their diverse biological activities, especially their anticancer effects. In this study, we are creating a new series of carbazole-based molecules and assessing them through molecular docking against the epidermal growth factor receptor (EGFR) to examine their binding strengths and interaction characteristics. Promising candidates, based on their docking performance, are being synthesized through methodical, step-by-step synthetic routes. By integrating computational docking, the comprehensive project seeks to develop carbazole-derived compounds as potential anticancer agents.

Keywords: Carbazole derivatives; EGFR inhibition; Molecular docking; ADME Predication

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Pharmaceutical Chemistry
Oral Presentation

Abstract Id: PCHE/OP/01

DEVELOPMENT AND VALIDATION OF STABILITY-INDICATING RP-HPLC METHOD OF QUERCETIN DIHYDRATE

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Abstract

Quercetin dihydrate is a plant extract which is used as drug due to its widely therapeutic potential like- antioxidant and anti-inflammatory actions. It belongs to flavonoid family, a class of polyphenolic compounds. It is one of the most studied and used flavonoid as it is present in foods like- onions, berries, grapes, apples, etc. Quercetin is derived from a latin word "oak forest" as it is found in various dietary foods. The research on quercetin dihydarte has also shown its anticancer effects as it inhibit cancer cell proliferation and by modulating cellular signaling pathways (NF-KB, MAPK and PI3K-AKT). By using HPLC validation parameters of Quercetin Dihydrate like - Linearity, Robustness, Precision, Accuracy and Ruggedness are performed successfully. This present work is designed to develop and validate a RP-HPLC method of Quercetin Dihydarte. For this, we have planned a fast and accurate RP-HPLC method by using Waters model 2489, Software Empower Pro as an instrument. Chromatographic separations done by C18 column (3.9×300mm) with 10µm particle size. A mixture of water, methanol, acetonitrile and glacial acetic acid in a specific ratio used as a mobile phase with flow rate of 1ml/min. UV detector and 255nm wavelength were used with the run time of 10min. Linearity has been performed in the concentration range of 2 to10 ppm for Quercetin Dihydrate.

Result: The linearity of quercetin dihydrate on HPLC was calculated 0.986% and the correlation of uv was found to be 0.9526.

Keywords: Quercetin Dihydrate, RP-HPLC, UV- Detector and Cancer.

Abstract Id: PCHE/OP/02

2D QSAR, Molecular Docking, and ADMET Analyses of Urea Compounds as Effective Inhibitors of Soluble Epoxide Hydrolase

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Abstract

Alzheimer's disease represents the most prevalent form of dementia; however, existing medications primarily provide symptomatic relief and exhibit limited capabilities in prevention, therapy, or modification of the disease itself. This has led to an increased focus on exploring different disease pathways. Soluble epoxide hydrolase (sEH) is an enzyme present in various tissues and plays a crucial role in metabolism and detoxification. To overcome this issue, we utilized a 2D-QSAR model to identify novel potent sEH inhibitors from a set of 42 previously established 1,3-disubstituted

urea compounds. The validation of this 2D-QSAR model was enhanced through molecular docking simulations, followed by an ADMET analysis of the compounds. The established 2D-QSAR model demonstrated reliability, statistical validity, and high predictive capability. The molecular docking studies conducted with these compounds validated our 2D-QSAR model.

Keywords: Soluble epoxide hydrolase; MLR; PLS; molecular docking; ADMET; Alzheimer; Neuroinflammation.

Abstract Id: PCHE/OP/03

Structural insights for peptide and small molecule-based drug discovery targeting the Keap1 Kelch domain

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Abstract

The KEAP1-Nrf2 pathway plays a pivotal role in redox homeostasis and cellular stress. Abnormal regulation of this pathway results in neurodegenerative diseases, including Alzheimer's disease and Parkinson's disease, cancer, and diabetes. Targeting the KEAP1Kelch domain presents a promising therapeutic strategy to regulate Nrf2 activity. Structural insights acquired from macromolecular crystallography have enabled the development of potent inhibitors disrupting the KEAP1-Nrf2 interaction. This article focuses exclusively on compiling studies of the 112 KEAP1 structures co-crystallized with peptides and small- molecule ligands over the past 20 years, investigating the interactions that govern inhibitory potency. After a thorough review, small molecule ligands have been classified according to their chemical structures, including naphthalene, isoquinoline, benzotriazole, pyrazole, and azabicyclic, along with their biological efficacies, to investigate the decisive interactions at the orthosteric site. Among all the reported PDB records of KEAP1, hydrogen bonding, cation-π, π-π stacking, and salt-bridge interactions predominantly contribute to stabilizing protein-ligand complexes. These insights will pave the way for the design and development of selective peptide and small molecule-based ligands for regulating the KEAP1-Nrf2 pathway, providing breakthroughs for the management of various diseases.

Keywords: Kelch domain, peptides, small molecules, macromolecular crystallography, P1-P6 sub-pockets, neurodegenerative diseases.

Abstract Id: PCHE/OP/04

Enhancing Cilnidipine solubility using co-amorphous formulation with L-Tryptophan: Molecular docking, Physicochemical Characterization, and Development of Optimized Fast-dissolving tablets

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Abstract

Cilnidipine (CIL), is a calcium channel blocker and a BCS Class II drug, exhibits poor aqueous solubility. The study aimed to enhance CIL's solubility through the development of a co-amorphous (COAM) system using L-tryptophan (1:1 molar ratio). Molecular docking was employed before formulation to investigate interactions, such as hydrogen bonding, π-π and σ-π stacking, confirming a strong binding affinity between CIL and the amino acids. The COAM system was prepared using the solvent evaporation method, and subsequently characterized using FTIR spectroscopy, Differential scanning calorimetry (DSC), X-ray powder diffraction (XRPD), 1 H-NMR spectroscopy and scanning electron microscopy (SEM). COAM formulation significantly improved solubility by 15.75-fold (81.766 ± 0.5 mg/mL) compared to pure CIL (5.19 ± 0.07 mg/mL) attributed to its transformation into an amorphous state, associated decrease in heat flow and protonation effects. Fast-dissolving tablets (FDTs) incorporating the COAM were developed via direct compression and optimized using a Box-Behnken Design (BBD) to evaluate essential formulation

parameters. The FDTs (F1–F15) demonstrated acceptable physicochemical properties, including uniform weight (99.69 ± 7.47 to 103.87 ± 6.25 mg), hardness (2.48 ± 0.78 to 2.67 ± 0.56 kg/cm²), friability (<1%), thickness (3.52 ± 0.14 to 3.59 ± 0.15 mm), drug content (92 ± 0.16 to 99 ± 0.78%), and disintegration time (61 ± 2.02 to 87 ± 1.12 s). The optimized formulation (F14) exhibited rapid disintegration (61 ± 2.02 s) and the highest drug release (94.86 ± 0.29%). This research highlights the potential of COAM for improving the delivery of poorly soluble drugs in the pharmaceutical industry.

Keywords: Cilnidipine, Co-amorphous, Molecular Docking, Amino Acid, Fast-dissolving Tablet

Abstract Id: PCHE/OP/05

Artificial Intelligence in Drug Repurposing: Smarter Drug Discovery

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Abstract

Artificial intelligence (AI) has become a transformative force in the field of drug repurposing, enabling the discovery of new therapeutic applications for existing drugs. AI-driven computational models, particularly those based on machine learning, deep learning, and knowledge graphs, can analyse vast biomedical datasets to identify hidden patterns and drug-
target interactions. These algorithms streamline virtual screening, predict drug-response profiles, and assist in uncovering novel indications for approved drugs, significantly reducing
the cost and time associated with traditional drug discovery. Integration of AI with molecular docking and real-world evidence such as electronic health records has enhanced prediction accuracy and personalized therapeutic development. Despite these advances, challenges persist, including data standardization, interpretability of complex models, and the need for human validation through expert-in-the-loop systems. Future progress lies in developing explainable AI (XAI) systems and hybrid models that combine computational power with clinical insight, advancing precision medicine.

Keywords: Artificial intelligence, Drug repurposing, Machine learning, Personalized therapy.

Abstract Id: PCHE/OP/06

Skeletal Editing Via CH→N Atom Swapping in Fused Imidazoles: Access to Triazolo[5,1-a]isoquinoline, Triazolo[1,5-a]quinoline, and Triazolo-[1,5-a]pyridines Frameworks

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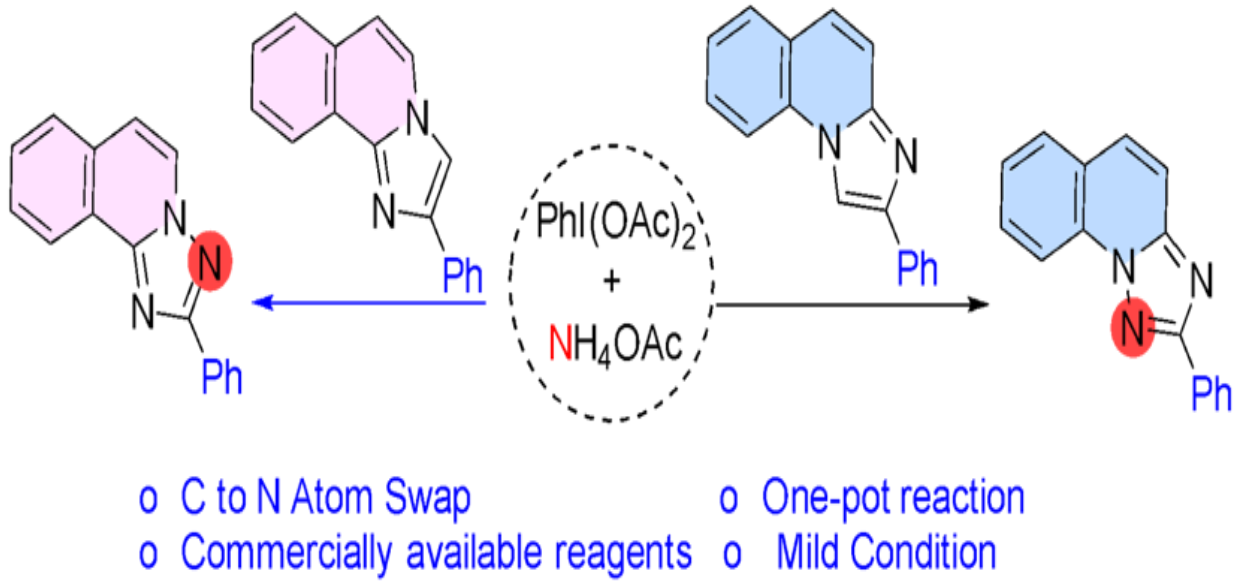
Abstract

Herein, we report a practical and efficient carbon-to-nitrogen atom swap in 2-phenylimidazo[2,1-a]isoquinoline and 2-phenylimidazo[1,2-a]quinoline scaffolds, enabling their direct conversion to the corresponding 2-phenyl-[1,2,4]triazolo[5,1-a]-isoquinoline and 2-phenyl-[1,2,4]triazolo[1,5-a]quinoline analogues. This transformation exploits the intrinsic reactivity of the parent heterocycles to undergo a cascade sequence involving oxidative cleavage, amination, and cyclization (OCAC) under mild conditions with functional group tolerance.



Abstract Id: PCHE/OP/07

Repurposing of Ambroxol for Rheumatoid Arthritis Using Molecular Docking and Molecular Dynamic Simulation Integrated with Experimental Studies

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Abstract:
Rheumatoid arthritis (RA) is a chronic inflammatory autoimmune disorder associated with chronic inflammation and destruction of joints. Due to the constraints of the existing treatments and their side effects, drug repurposing is an expedited and affordable approach to finding new therapeutic solutions. Molecular docking is done to determine the binding affinity of Ambroxol with the major inflammatory targets such as TNF-α, PP1-α, and PP1-γ. The formed docking complexes demonstrate that they bind with high affinity in the active sites of the proteins of Ambroxol. Molecular dynamics simulations (50 ns) are then performed to determine the stability and conformation of the most preferable complexes, and stable interactions and good energy profiles are observed. Experimental analysis will be conducted with the synovial fibroblast cell models in order to evaluate its influence on the inflammatory cytokine expression and oxidative stress. This may indicate that Ambroxol can act as a multi-target inflammatory modulator through the multi-target nature of the anti-rheumatoid effects of this drug and thus could be a promising repurposed therapeutic option in the management of rheumatoid arthritis.

Keywords: Rheumatoid arthritis, Molecular docking, Molecular dynamics simulations, TNF-α, PP1γ, and PP1α

Abstract Id: PCHE/OP/08

Integrative In-Silico Study on Chromane Derivatives for Type 2 Diabetes: A Combined Approach of Molecular Docking, ADMET, and Toxicity Prediction

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Abstract

Type 2 diabetes mellitus (T2DM) is defined as a heterogeneous metabolic disease characterized by diminished insulin sensitivity in the periphery, progressive pancreatic β-cell dysfunction, and persistent hyperglycemic states. Its etiology is related to complex gene-environment interactions, which include hereditary genetic susceptibility, inactivity and exposure to an obesogenic environment. The disease is often manifested together with comorbid metabolic diseases, such as dyslipidemia, arterial hypertension and chronic low-grade systemic inflammation, which compound the cardiovascular risk and morbidity. The rapid and increasing global incidence of T2DM is one of the greatest health burdens as a wide ranging endocrinometabolic disorder and presents challenges to public health as well. Data presented here describe the pharmacological potential of Chromane derivatives using comprehensive in silico approaches. Rigorous systematic amino acid replacements at the C-2 position of the Chromane scaffold were undertaken in order to assess their antihyperglycemic effects. Advanced computer-aided drug design (CADD) platforms allowing for Swiss ADME, Discovery Studio Biovia and PyRx were utilized to design and virtually screen a library of amino-acid conjugated Chromane analogues. Molecular parameters evaluated with rigour included binding affinity to diabetes relevant biological targets, drug-likeness, ADME (absorption, distribution, metabolism and excretion) parameters and possible off-target effects. The in-silico studies indicated several high affinity Chromane derivatives with pronounced antidiabetic potential, which could serve as lead compounds for further translational preclinical and clinical development. In conclusion the present work brings to attention the therapeutic benefits of drug classes based on Chromane as novel antidiabetics and emphasizes the importance of computational strategies in expediting drug development for multifactorial metabolic diseases such as type 2 diabetes mellitus.

Keywords: T2DM, Chromane analogues, Swiss ADME, Biovia and PyRx.

Abstract Id: PCHE/OP/09

Structure-Based Drug Design and ADMET Analysis of Loliolide as a Novel Antihypertensive Lead Compound

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Abstract:
Hypertension is one of the most prevalent cardiovascular disorders and a leading cause of morbidity and mortality worldwide. This demand for safer and more effective antihypertensive agents has led researchers toward the development of bioactive natural compounds. Loliolide is a monoterpenoid lactone of natural origin, present in several medicinal plants, which shows several pharmacological activities, such as antioxidant, anti-inflammatory and vasoprotective effect. The present work aims to evaluate the antihypertensive activity of Loliolide by applying a strategy of Structure-Based Drug Design (SBDD) associated with the use of Computer-Aided Drug Design (CADD) resources. Therefore, the molecular structure of Loliolide was created using the CamDraw software and docking studies were carried out using the Discovery Studio Biovia and PyRx programs with Angiotensin Converting Enzyme (ACE PDB ID: 1O8A) as the molecular target. The localizations of these molecules allowed the physicochemical, pharmacokinetic and drug-likeness characteristics to be evaluated using the Swiss ADME software, and the prediction of drug toxicity and side effects was also carried out using the ProTox-II and Way2Drug software programs. The results obtained indicated that these molecules present good binding affinity and stable formation of the complexes, suggesting that Loliolide can have a good interaction with the target enzyme, ACE. In addition, ADMET analysis shows good oral bioavailability, non-toxic and adequate pharmacokinetic properties. Therefore, the results point to Loliolide as a promising lead compound of antihypertensive activity, revealing the importance of uniting SBDD strategies with the arsenal of modern computational tools for drug discovery.

Keywords: Loliolide, Hypertension, SBDD, Swiss ADME software and CADD.

Abstract Id: PCHE/OP/10

Method Development and Validation of Elvitegravir drug by using RP-HPLC and UV-Spectrophotometer with Forced Degradation Studies

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Abstract

The study focused on the development, validation, and forced degradation studies of an analytical method for the estimation of Elvitegravir (EVG), an integrase strand transfer inhibitor used in HIV treatment. The analysis was carried out using Reverse Phase High Performance Liquid Chromatography (RP-HPLC) and UV-Spectrophotometry according to ICH Q2(R1) (validation) and ICH Q1A(R2) (forced-degradation studies) guidelines. The RP- HPLC method was optimized with a C18 column (250 mm × 4.6 mm, 5 µm) with an isocratic mobile phase consisting of acetonitrile: methanol: buffer (0.05 M Potassium dihydrogen phosphate) (70:20:10 v/v/v), a flow rate of 0.25 mL/min and a detection wavelength of 267 nm. producing a sharp peak with a retention time of 3.9 min. The method displayed excellent linearity (10–50 µg/mL; R^2 = 0.9995), accuracy (99.07-99.28%), precision (%RSD < 0.5), and sensitivity (LOD = 0.3 µg/mL; LOQ = 1.0 µg/mL). Forced degradation (stressed) studies under acidic, basic, oxidative, thermal, and photolytic environments showed minor degradation (3-5%), confirming the method's stability-indicating capability. Similarly, the UV spectrophotometric method developed with λmax 267 nm, exhibited linearity (10–50 µg/mL; R^2 = 0.9986), accuracy (99.07–99.28%), precision (%RSD < 0.52) and sensitivity (LOD = 0.25 µg/mL; LOQ = 0.85 µg/mL). The UV method likewise demonstrated equivalent degradation behaviour, which confirmed its application as an alternative, simple, precise, and economical. Both analytical methods were found to be robust, precise, accurate and reproducible, establishing their suitability for routine quality control and stability assessment of EVG in bulk and pharmaceutical formulations.

Keywords: Elvitegravir, RP- HPLC, Method development, Validation and LOD

Abstract Id: PCHE/OP/11

AI-DRIVEN TRANSFORMATION IN DRUG DEVELOPMENT AND DESIGN

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Abstract

Advanced agentic artificial intelligence (AI) and multi-agent platforms are transforming the drug discovery pipeline by enhancing automation, prediction accuracy, and parallelization. These systems employ autonomous AI models capable of performing molecular docking
simulations, quantitative structure–activity relationship (QSAR) modelling, and comprehensive ADMET (absorption, distribution, metabolism, excretion, and toxicity) predictions. Coordinated multi-agent architectures enable simultaneous evaluation of extensive chemical libraries and therapeutic targets, with adaptive learning mechanisms that continuously refine predictive algorithms using experimental feedback. This approach significantly accelerates compound screening, hit-to-lead transitions, and lead optimization. In clinical development, AI-driven automation streamlines patient recruitment, data validation, and protocol compliance, resulting in shorter trial durations, improved data integrity, and reduced regulatory delays. The integration of these technologies has demonstrated substantial reductions in overall drug development time and cost compared to conventional methods, while decreasing failure rates across preclinical and clinical stages. A notable example includes AI-discovered compounds LP-184 and LP-284, which target advanced tumours and lymphomas and progressed rapidly from discovery to clinical research. These successes illustrate the potential of agentic AI and multi-agent systems to accelerate precision therapeutic development and enhance patient outcomes. The U.S. Food and Drug Administration (FDA) emphasizes that the clinical application of AI-derived drugs must adhere to guidelines ensuring reliability, transparency, and safety. Overall, agentic AI

platforms represent a paradigm shift in pharmaceutical research, delivering faster, more cost-effective, and data-driven pathways to novel therapeutics.

Keywords: Artificial Intelligence, QSAR, ADMET, LP-184 and LP-284.

Abstract Id: PCHE/OP/12

Molecular Docking and Pharmacokinetic Profiling of Isopelletierine Against Diabetes-Related Targets: A Computational Approach

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Abstract

Type 2 Diabetes (T2DM) is a polygenic metabolic disease defined by peripheral insulin resistance, pancreatic β-cell dysfunction, and chronic hyperglycemia. Its pathogenesis occurs via abnormalities of insulin receptor signalling, and of glucose and lipid metabolism, influenced by genetic, epigenetic, and environmental influences. T2DM is closely related to inflammation and dyslipidaemia associated with obesity, and is a major global health problem associated with significant cardiometabolic morbidity. This study evaluates comprehensively the therapeutic effectiveness of Isopelletierine, a liquid alkaloid isolated from Punica granatum (pomegranate), using integrative in silico approaches. Bioisosteric changes were systematically undertaken at C-1, C-2, C-3 of the Isopelletierine molecule, to achieve the greatest possible anti-diabetic activity. Computer Aided Drug Design (CADD) platforms, Swiss ADME, Discovery Studio Biovia and PyRx, were employed to design and virtually screen a range of amino acid conjugates of the compound. These were screened for molecular docking affinity to physiologically relevant protein targets in diabetes, drug-likeness, pharmacokinetic (ADME) data, and undesired molecular interaction effects. In silico analysis resulted in the description of several Isopelletierine bioisosteric derivatives with a high potential anti-diabetic action, and which could be classified as lead compounds for extensive preclinical and clinical validation. Thus, these data suggest that Isopelletierine bioisosteres are a new generation of potential anti-diabetic compounds and exemplify the enabling power of in silico processes to accelerate the discovery of compounds for the treatment of complex metabolic disorders such as Type 2 Diabetes.

Keywords: Isopelletierine, bioisosteres, QSAR, ADME, T2DM and hyperglycemia.

Abstract Id: PCHE/OP/13

Structure-Based Design and Molecular Docking of Chromone Derivatives Targeting Plasmodial Proteases for Antimalarial Activity

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Abstract

Malaria is an infectious disease transmitted by parasitic protozoa of the genus Plasmodium, which are primarily conveyed by the blood-sucking propensities of the female Anopheles mosquitoes. Clinically, the disease manifests by recurrent paroxysms of fever, alternating with symptoms of chills and profuse perspiration, which are due to the occurrence in the blood of the parasite with the resultant intra-erythrocytic multiplication thereof, and hemolytic anemia of a greater or less degree, which is induced by the excessive destruction of blood-cells. Plasmodium falciparum is known to be the most virulent type, being responsible for the great bulk of the severe and fatal cases. Increasing resistance to both pharmacological, anti-malarial chemotherapeutics as well as to insecticidal measures constitutes a great challenge, and points most strongly to the necessity for the investigation of new therapeutic measures and better means of vector control in order to combat the overwhelming global health crisis of malaria. The

object of the present investigation will be to set out the pharmaceutical evaluation of the chemotherapeutic potential of some of the derivatives of Chromone by means of advanced and state-of-the-art computer aided research methods. Considerable bioiostere modifications will be introduced at the C-1 and C-2 positions of the Chromone nucleus, in order to test out their potential anti-plasmodial properties. In the computational evaluation, drugs will be designed and studied used by computer aided drug design (CADD) methodologies via computer modelling programs which embrace the following: Swiss ADME, Discovery Studio Biovia, PyRx etc. A library of amino acid conjugated Chromone compounds will be manufactured in this investigation and studied with respect to the molecular modelling and computer-aided evaluation to which reference has previously been made. Amongst the many parameters which will be covered in this in-silico study, will be considered the factors of molecular docking to biological targets specific to Plasmodium, the drug likenesses, the ADME (absorption distribution, metabolism and elimination) profiles, and possible off target interaction screens. The in-silico studies reveal a number of Chromone derived entities which possess high affinity and anti-malarial activity, and are notable lead compounds for further pre-clinical and clinical investigation. Collectively these research results can contribute to evaluating the importance of the paradigms of computer aided discovery of new drugs an also reveal the conspicuous possibilities of Chromone derivatives as possible agents of new generation anti-malarial therapeutics.

Keywords: Chromone derivatives, anti-malarial, CADD, ADME, Biovia and PyRx.

Abstract Id: PCHE/OP/14

In Silico Evaluation of Coumarin Derivatives: Revealing Their Potential as Novel Antioxidant Agents

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Abstract:
The present study investigates the in-silico evaluation of 25 newly designed coumarin derivatives to explore their potential as novel antioxidant agents. Molecular docking studies were performed using glutathione reductase (PDB ID: 1GRA), a key enzyme responsible for maintaining intracellular redox homeostasis. The docking results revealed that four coumarin derivatives exhibited stronger binding affinities and more stable interactions within the active site of glutathione reductase compared to the standard antioxidant drug, glutathione. These top performing derivatives formed crucial hydrogen bonds and hydrophobic interactions with key catalytic residues of the enzyme, indicating their potential to enhance glutathione recycling and antioxidant defence. Overall, the in-silico findings highlight coumarin scaffolds as promising candidates for the development of effective antioxidant therapeutics targeting glutathione reductase.

Keywords: Coumarin derivatives, In silico docking, Glutathione reductase, 1GRA, Antioxidant activity, Molecular modelling, Drug design.

Abstract Id: PCHE/OP/15

Fabricating nanoemulsion in increasing therapeutic management of HIV and herpes simplex virus

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Abstract:
Nanoemulsion is a promising strategy in drug delivery, offering high bioavailability and efficacy in accomplishing therapeutic outcomes. We have fabricated a nanoemulsion formulation with dual therapeutic response on HIV and HSV. The loaded drugs come from BCS classes 2 and 3. HIV-1 protease enzyme is important in vital maturation, which has been altered by one of our drugs through its protease inhibition action. The second drug hampers viral DNA polymerase when phosphorylated in an infected cell; it's a guanosine analog potent for inhibiting HIV.

Nanoemulsions have a small droplet size and more surface area, categorizing them as potent for effective solubility, stability, and site-specific delivery. Nanoemulsions are selected as they have therapeutic efficacy, high bioavailability, and low systemic toxicity. In fabricating a formulation, one has to select an oil surfactant, a co- surfactant, and their concentration. In the fabrication of this formulation, we have selected Kolliphor 40 and Taranscutol HP as surfactant and co-surfactant. The selection of oil, surfactant, and co-surfactant was done by solubility and miscibility studies. Their profile has been evaluated on the basis of droplet size, stability, release profile, etc. This formulation can provide effective results over conventional drug delivery. So it can be a novel approach in the strategy of HIV and HSV treatment.

Keywords: Nanoemulsion, HIV, Herpes simplex virus, drug delivery, bioavailability, anti- retroviral, Protease inhibitor, droplet size, drug stability.

Abstract Id: PCHE/OP/16

Neuroprotective effects of polyphenol rich extract of Padina boergesenii in cuprizone induced multiple sclerosis in Wistar rats

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Abstract:
Multiple sclerosis (MS) is a chronic, immune-mediated neurodegenerative disorder characterized by demyelination of the central nervous system (CNS), leading to progressive neurological dysfunction. Recent studies have primarily focused on exploring natural bioactive compounds with neuroprotective and immunomodulatory potential to mitigate MS. Marine macro-algae, particularly Padina boergesenii (a brown seaweed), is rich source of bioactive compounds, including polyphenols such as phlorotannin, bromophenols and flavonoids. The present study aims at investigating the neuroprotective effects of polyphenol rich extract of Padina boergesenii (PREPB) in cuprizone induced MS in Wister rats. Novel object recognition and Morri's water maze tests were performed to estimate the cognitive function in rats which was found to be significantly ($p \leq 0.001$) improved in PREPB treated animals. Additionally, motor coordination was also significantly ($p \leq 0.001$) improved in PREPB rats as accessed in the open field, locomotor activity and rotarod tests. Biomarkers associated with mitochondrial biogenesis (PGC1-α, Cytochrome-C and SIRT1), inflammation (TNF-α, IL-6), neuroprotection (BDNF), and demyelination (MBP) in brain tissue were estimated using ELISA and all these markers were improved by PREPB treatment. Histological reports also supported the neuroprotective behavior of PREPB. The findings of the present study, for the first time, reported the pre-clinical evidence of Padina boergesenii, against multiple sclerosis and concludes that the polyphenols of this macro-alga showed remyelination as well as neuroprotective effects and offers a potential novel source of bioactive molecules against multiple sclerosis.

Keywords: Cuprizone, S. *wightii*, Polyphenols, Demyelination, Multiple Sclerosis, Neuroprotection.

Abstract Id: PCHE/OP/17

Integrating Computational Design and Synthesis for Novel Antirheumatic Drug Discovery.

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Abstract:

The discovery of novel antirheumatic drugs is crucial in combating rheumatoid arthritis, a debilitating autoimmune disease that affects millions worldwide. This abstract explores the integration of computational design and synthesis methodologies to enhance the drug discovery process. By leveraging advanced algorithms and machine learning techniques, researchers can predict the pharmacological profiles of new compounds with increased accuracy. The computational design framework enables the identification of potential antirheumatic candidates through virtual screening and optimization of molecular structures. Subsequent synthesis of selected candidates is streamlined via automated and high-throughput techniques, facilitating rapid evaluation of biological efficacy. Preliminary in vitro and in vivo studies demonstrate the potential of these synthesized compounds in modulating key inflammatory pathways associated with rheumatoid arthritis. The synergistic approach of combining computational techniques with synthetic chemistry not only accelerates the pace of drug discovery but also enhances the likelihood of successful outcomes in clinical settings. Our findings underscore the importance of interdisciplinary collaboration in addressing complex biomedical challenges, ultimately leading to the development of safer and more effective therapeutic options for patients afflicted by rheumatic diseases. Future research directions will focus on refining predictive models and further optimizing lead compounds for enhanced efficacy and safety profiles.

Keywords: Rheumatoid arthritis, Antirheumatic drugs, Computational drug design, Virtual screening, Molecular optimization, Drug synthesis, Inflammatory pathways.

Abstract Id: PCHE/OP/18

To evaluate the therapeutic potential of benzimidazole derivatives as multifunctional agents against Alzheimer's disease

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Abstract:
Alzheimer's disease (AD) is a neurodegenerative disorder that gets worse over time and causes cognitive decline, memory loss, and the death of neurons. Current therapeutic agents mainly provide symptomatic relief without substantially modifying disease progression, necessitating the urgent development of innovative and multifunctional drug candidates. Benzimidazole, a unique heterocyclic scaffold, has attracted considerable interest owing to its structural resemblance to natural nucleotides and its extensive pharmacological attributes. Through a variety of mechanisms, benzomidazole derivatives show encouraging anti-Alzheimer activity. A number of substances have demonstrated the capacity to increase cholinergic neurotransmission by blocking acetylcholinesterase (AChE). Derivatives with metal-chelating qualities can also lessen oxidative stress and stop amyloid-β aggregation, two of AD's main pathological characteristics. By altering important enzymes and signaling pathways implicated in neurodegeneration, certain benzimidazole analogues also exhibit tau phosphorylation inhibition and neuroprotective effects. Substitution at the first and second positions of the benzimidazole ring improves target specificity and blood-brain barrier penetration, according to structure–activity relationship (SAR) studies. Creating multi-target directed ligands (MTDLs) that target the inflammatory, tau, and amyloid pathways all at once is one recent development. All things considered, benzimidazole derivatives are a class of multifunctional agents that show great promise for Alzheimer's treatment in the future, supporting further study and development.

Keywords: Alzheimer's disease, Acetylcholinesterase inhibitors, Amyloid-β aggregation, Neuroprotection, Multi-target directed ligands (MTDLs), Structure–activity relationship (SAR) and Neurodegeneration.

Abstract Id: PCHE/OP/19

Synthesis, characterization, pharmacological activity and 3D-QSAR study of some novel benzoxazole bearing thiazolidinone derivatives

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Abstract:
Benzoxazoles are used primarily in industry and being a heterocyclic compound, benzoxazole finds use in research as a starting material for the synthesis of larger, usually bioactive structures. The present study involves synthesis of novel series of Benzoxazole moiety bearing 3-(benzo[d]oxazol-2-yl)-5-(4-chlorophenyl)thiazolidin-2-one derivatives and evaluation of their anticancer and anti-inflammatory activity. The synthesis involves three steps reaction to give 20derivatives which were characterized by FT-IR, 1 H-NMR and Mass spectrometry. Anti- inflammatory activity was carried out using carrageenan induced paw edema method and anticancer activity was carried out using Onion root model. It was found that electron withdrawing substituent's on phenyl ring containing chloro and nitro group exhibited good anti-inflammatory activity while electron donating substituent's containing hydroxy, methyl and methoxy group exhibited good anticancer activity. The results obtained were statistically analyzed by 3D QSAR model and found that the multiple linear regression method gave best result for anti-inflammatory activity and method gave best result for anticancer activity. 3DQSAR results revealed that addition of electropositive and bulky groups at the phenyl ring will contribute towards increase in the anti-inflammatory activity of the molecules, while it suggests the requirement of electrostatic properties in the structure to maximize the anticancer activity.

Keywords: Benzoxazoles, 3D QSAR, anti-inflammatory activity and anticancer activity.

Abstract Id: PCHE/OP/20

Molecular Docking Studies for Predicting Drug–Receptor Interactions

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Abstract:
Molecular docking is a vital computational technique in modern drug discovery that predicts the preferred orientation and binding affinity of a drug molecule to its biological target. It serves as an essential tool in structure-based drug design (SBDD), allowing researchers to visualize and understand drug-receptor interactions at the molecular level. The process involves the preparation of both ligand and receptor structures, identification of active sites, and simulation of their binding interactions using specialized software such as AutoDock, Glide, or GOLD. Docking algorithms estimate the binding energy and predict the stability of the complex, enabling the identification of potent lead compounds before experimental validation. In silico
approach offers several advantages, including reduced time, cost, and the need for animal testing during early drug development stages. It also aids in virtual screening, optimization of lead molecules, and repurposing of existing drugs. However, limitations such as simplified biological environments and dependency on accurate 3D structures necessitate subsequent experimental confirmation. Recent advancements, including integration of artificial intelligence, molecular dynamics simulations, and cloud-based platforms, have further enhanced the predictive accuracy and scope of docking studies. Overall, molecular docking provides a powerful and efficient pathway to identify and optimize new therapeutic agents, significantly accelerating the transition from molecule to medicine.

Keywords: Molecular docking, SBDD, AutoDock and GOLD

Abstract Id: PCHE/OP/21

In Silico Drug Screening: Accelerating Molecule to Medicine Transition

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Abstract:
In silico drug screening has revolutionized the early stages of drug discovery by employing computational methods to identify, design, and optimize potential therapeutic molecules before laboratory testing. This approach integrates bioinformatics, cheminformatics, and molecular modeling to virtually evaluate the interaction of drug candidates with specific biological targets. Through techniques such as molecular docking, virtual screening, and ADMET (Absorption, Distribution, Metabolism, Excretion, and Toxicity) prediction, researchers can efficiently assess thousands of compounds, selecting only the most promising for experimental validation. The in-silico strategy significantly reduces time, cost, and animal experimentation associated with traditional drug development. It allows for rapid identification of lead molecules, prediction of pharmacokinetic properties, and detection of possible toxicity or off-target effects. Moreover, it supports drug repurposing by uncovering new therapeutic uses for existing compounds. Recent advancements in artificial intelligence, machine learning, and cloud computing have further enhanced the accuracy and speed of virtual screening platforms. By integrating these tools, researchers can better understand molecular interactions and accelerate the transition from molecule discovery to clinical application. In summary, in silico drug screening serves as a powerful, sustainable, and predictive approach that complements experimental research transforming the conventional "trial-and-error" paradigm into a data-driven process and expediting the journey from molecule to medicine.

Keywords: Molecular docking, ADME, AutoDock and GOLD

Abstract Id: PCHE/OP/22

Reconnoitering Quinazoline-Ureido derivatives targeting sEH and EGFR towards development of novel anticancer agents: A molecular modelling approach

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Abstract:
Cancer was identified as a serious and concerning disease, ranking as the second leading cause of mortality in humans after cardiovascular diseases. The primary objective of the research was to develop drug-like molecules that not only exhibited enhanced efficacy but also minimized side effects. Researchers conducted extensive molecular docking studies on both sEH and EGFR enzymes. To further evaluate the stability of potent compounds within the active sites of sEH and EGFR, a detailed molecular dynamics simulation over a 500 ns timescale was performed, confirming the strong binding of these ligands and suggesting their potential as promising lead candidates for antitumor agents. Additionally, ADMET and drug-likeness assessments were also performed. The analysis revealed that the molecules DKP10 and DKP23 demonstrated strong interactions with critical amino acid residues in the binding cavity, achieving docking energies of -10.9 and -8.9 kcal/mol, as compared to Afatinib and S38 (docking energy: -8.0 and -8.9 kcal/mol). To further evaluate the stability of DKP10 and DKP23, a detailed molecular dynamics simulation using Desmond module over a 500 ns timescale was performed, confirming the strong binding of these ligands and suggesting their potential as promising lead candidates for antitumor agents. Additionally, ADMET and drug-likeness assessments indicated that DKP23, DKP1, and DKP10 predicted over 94% oral absorption in humans, outperforming other compounds. Comprehensive in-silico analyses demonstrated the ability of the designed molecules to effectively inhibit both sEH and EGFR. These findings provided a promising foundation for the development of new lead compounds aimed at addressing the devastating effects of cancer.

Keywords: ADMET, Cancer, EGFR and DKP23

Abstract Id: PCHE/OP/23

Molecular Dynamics Simulations for the Investigation of Structural Dynamics and Water-Mediated Self-Assembly in Posaconazole SEDDS

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Abstract:
Posaconazole (PSC), a Biopharmaceutics classification system-II (BCS II) antifungal drug, faces challenges in achieving therapeutic plasma levels due to its lipophilicity and low water solubility. Self-emulsifying drug delivery systems (SEDDS) incorporating eugenol, polysorbate 21, and polyethylene glycol (PEG 200) enhance PSC solubility, stability, and bioavailability by forming stable oil-in-water emulsions. Understanding the self-assembly, drug localization, and interfacial properties of SEDDS is crucial for optimizing formulation efficiency. Molecular dynamics (MD) simulations provide valuable insights into these aspects. This study employs MD simulations to investigate the water-dependent phase behaviour of a PSC SEDDS comprising Eugenol, PEG 200, and Tween 21. Simulations were performed at different water mole percentages (0%, 1%, 70%, and 90%) over 400 ns in an NVT ensemble (number of particles (N), volume (V), and temperature (T) are kept constant) to analyze structural and dynamic transitions. Density profiles illustrate a shift from a dispersed state at low water content to micellar organization at higher concentrations, indicating water-driven self-assembly. Radial distribution functions (RDFs) quantify intermolecular interactions, revealing preferential associations among PSC, Tween 21, Eugenol, and PEG 200. Solvent-accessible surface area (SASA) and diffusion coefficients further characterize molecular exposure and mobility, correlating with observed phase transitions. Visualizations confirm a progressive transition from a non-solvated system to a well-defined micellar phase at high water content. These findings highlight the critical role of water in modulating component distribution and intermolecular interactions, providing essential insights for optimizing PSC SEDDS formulation and enhancing drug delivery efficiency.

Keywords: Posaconazole, SEDDS, molecular dynamics simulation, phase behaviour.

Abstract Id: PCHE/OP/24

The Theme of Rational Drug Discovery, emphasizing how These Methods Help Identify and Enhance Novel Antibacterial Compounds.

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Abstract:
Rational drug discovery represents a paradigm shift in the identification and development of novel antibacterial compounds, addressing the growing challenge of antibiotic resistance. This approach combines computational methods, chemical biology, and structural biology to systematically design and optimize therapeutic agents. By employing in silico modelling techniques, researchers can predict molecular interactions and assess the efficacy of potential candidates before synthesis. Moreover, structure-activity relationship (SAR) studies enable the modification of lead compounds, enhancing their antibacterial activity while minimizing toxicity. Recent advances in high-throughput screening and machine learning algorithms further augment the efficiency of this process, allowing for the rapid identification of promising new antibiotics. These abstract highlights the critical role that rational drug discovery plays in the fight against multidrug-resistant pathogens, emphasizing the integration of interdisciplinary

methodologies to foster innovation in antibacterial therapy. As the need for effective treatments intensifies, a focused commitment to rational drug discovery is imperative for the advancement of novel compounds that can combat the pressing public health threat posed by resistant bacteria.

Keywords: Rational drug discovery, Antibacterial agents, Antibiotic resistance, In silico modeling, Structure–activity relationship, Machine learning, Lead optimization.

Abstract Id: PCHE/OP/25

Designing New Drugs Using Fragment Based Discovery Approach

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Abstract:

Fragment-Based Drug Discovery (FBDD) is a modern and efficient approach in medicinal chemistry that focuses on identifying small chemical fragments, typically with molecular weights below 300 Da, that bind with measurable affinity to biological target sites. Unlike traditional high-throughput screening, which relies on testing large compound libraries of drug-sized molecules, FBDD aims to detect smaller fragments with simpler structures and higher ligand efficiency. These fragments serve as starting points for optimization through chemical elaboration, merging, or linking to produce potent, selective, and drug-like leads. The strength of FBDD lies in its ability to explore chemical space more efficiently because a relatively small library of fragments can cover a broader diversity of potential binding motifs compared to conventional compound collections. The process begins with fragment screening using sensitive biophysical techniques such as nuclear magnetic resonance (NMR), surface plasmin resonance (SPR), X-ray crystallography, or thermal shift assays. These methods allow researchers to detect weak interactions between fragments and the target protein with high precision. Fragment optimization is a crucial phase in which fragments are chemically modified to improve potency, binding specificity, and pharmacokinetic properties. Strategies such as fragment growing, fragment linking, and fragment merging enable the transformation of weakly binding fragments into strong inhibitors or modulators of the target. Computational approaches, including molecular docking, quantum mechanical modelling, and free energy perturbation (FEP) simulations, further accelerate this process by predicting favourable modifications and estimating binding energies. Machine learning and artificial intelligence (AI) tools have recently enhanced fragment selection and optimization by integrating data-driven predictions with structure-based design. In conclusion, fragment-Based Drug Discovery has revolutionized early-stage drug design by offering a rational, structure-guided pathway from small fragment hits to potent therapeutic compounds. Its success stems from its capacity to explore chemical diversity efficiently while providing detailed structural insights for optimization. As technology and computational methodologies continue to evolve, FBDD is poised to play a central role in the development of next-generation drugs. The integration of FBDD with AI-driven modelling and automation will further enhance its speed, precision, and success rate, shaping the future of rational drug discovery.

Keywords: Fragment-Based Drug Discovery, Fragment Screening, Structure-Based Design, Molecular Optimization, Computational Chemistry, Artificial Intelligence, Lead Generation, Medicinal Chemistry, Drug Design.

Abstract Id: PCHE/OP/26

Future Opportunities of the Structure-Activity Relationship (SAR) of Adamantane Derivatives for Multi-Target Alzheimer Therapy; Molecular Mechanisms, Pharmacophore Evolution, and Future Directions

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Abstract:

Background: Alzheimer disease (AD), which still accounts for a significant amount of dementia, is distinguished by amyloid-β (Aβ) deposition, tau hyperphosphorylation, synaptic abnormalities, and oxidative stress. The poor efficacy of conventional single-target medications has driven the creation of multi-target-oriented ligands (MTDLs).
Methodology: The tough, lipophilic tricyclic hydrocarbon that can acquire many functional changes and cross the blood-brain barrier has made the adamantane scaffold a frequently used pharmacophore for the development of central nervous system (CNS) medications. Memantine, the first adamantane derivative, showed N-methyl-D-aspartate (NMDA) receptor antagonism and was administered for Alzheimer disease. Subsequent generations of adamantine hybrids have emerged as molecular structures having anti-amyloid, antioxidant, anti-inflammatory, and cholinesterase inhibitor properties.
Conclusion: This review examines current developments in the structural-activity relationships (SAR) of anti-Alzheimer adamantane derivatives, underlining how changes to their electronic, steric, and linker areas affect receptor selectivity and multi-target interactions. It also discusses new technical acumen from docking and molecular dynamics investigations that highlight the important pharmacokinetic trends related to the blood-brain barrier.
Results: The data as a whole show that adamantine is an essential starting point for next-generation multifunctional medicines used to treat AD.
Keywords: Alzheimer disease, adamantane, multi-target directed ligands, SAR, cholinesterase inhibitors and Aβ aggregation

Abstract Id: PCHE/OP/27

Exploring the Anti-Bacterial Potential of Semi-synthetic Phytocannabinoid: Tetrahydrocannabidiol (THCBD) as Potential Anti-Bacterial Agent Against Sensitive and Resistant Strains of Staphylococcus aureus

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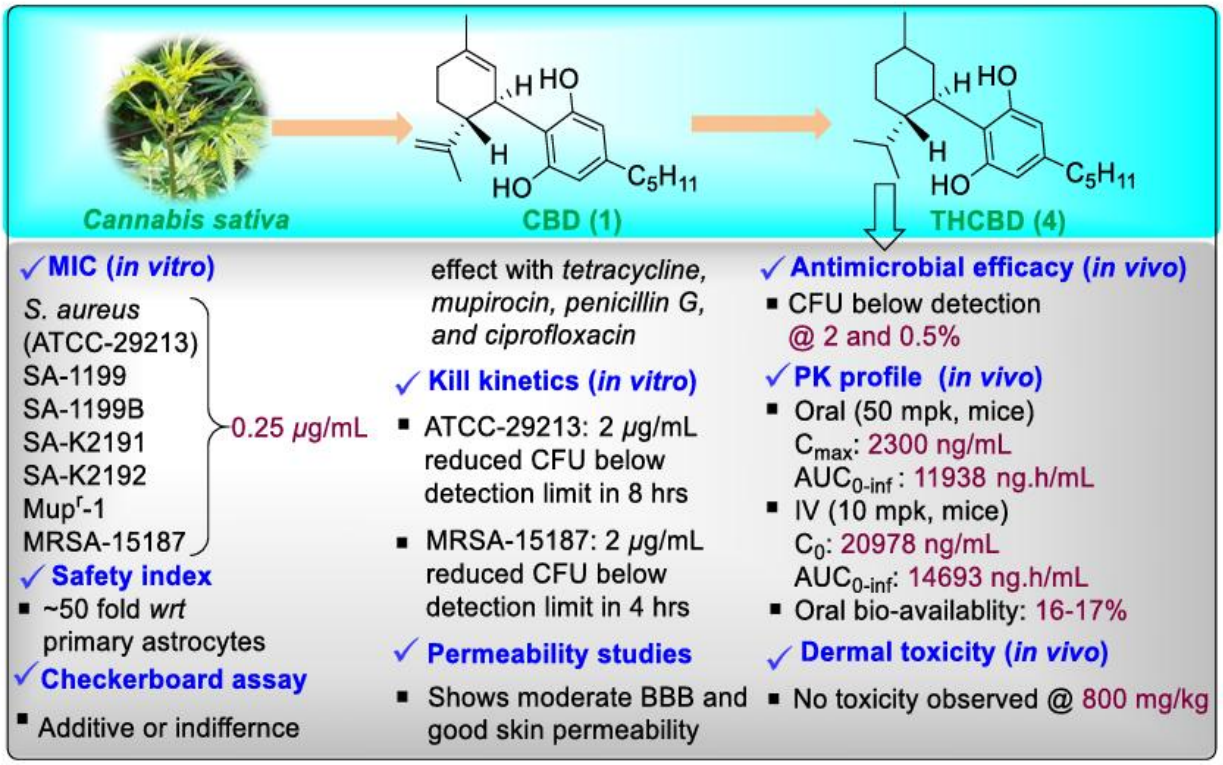
Abstract:
Anti-microbial resistance (AMR) is one of the most challenging problems and is responsible for millions of deaths every year. We therefore, urgently require new chemical entities with novel mechanism of action. Phytocannabinoids have been adequately reported for anti-microbial effect but not seriously pursued because of either stringent regulatory issues or poor drug-like properties. In this regard, the current work demonstrated the anti-bacterial potential of tetrahydrocannabidiol (THCBD, 4), a semi-synthetic phytocannabinoid, against Staphylococcus aureus, the second-most widespread bug recognized by the WHO. THCBD (4) was generated from cannabidiol and subjected to extensive anti-bacterial screening. In in vitro studies, the THCBD (4) demonstrated a potent MIC of 0.25 µg/mL against Gram-positive bacteria, S aureus ATCC-29213. It is interesting to note that THCBD (4) has demonstrated strong effectiveness against efflux pump over-expressing (SA-1199B, SA-K2191, SA-K2192, and Mupr -1) and multi-drug resistant (MRSA-15187) S. aureus strains. The THCBD (4) has also shown a good effect in kill kinetics assays against ATCC-29213 and MRSA-15187. In checkerboard assay, THCBD (4) has shown additive/indifference effects with several well- known clinically used antibiotics, tetracycline, mupirocin, penicillin G, and ciprofloxacin. THCBD (4) also exhibited good permeability in the artificial skin model. Most importantly, THCBD (4) has significantly reduced CFU in mice's in vivo skin infection models and also
demonstrated decent plasma exposure with 16-17% oral-bio-availability. Acute dermal toxicity of THCBD (4) suggests no marked treatment-related impact on gross pathophysiology. This attractive in vitro and in vivo profile of plant-based compounds opens a new direction for new generation antibiotics and warrants further detailed investigation.



Abstract Id: PCHE/OP/28

Pharmacophore-based screening, Molecular docking and molecular dynamics simulations for main protease of SARS-CoV-2 to develop a repurposed drug

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Abstract:

COVID-19 has posed a significant global health challenge, causing widespread illness, deaths, and significant disruptions to daily life, economies, and healthcare systems. Due to the seasonal incidence of severe illness and a high mutation rate, there is a critical need to create novel therapeutic medications. The primary objective of the study is to develop effective pharmaceutical interventions that specifically target the main protease of SARS-CoV-2 virus and disrupt disease progression. We have utilized the drug repurposing approach considering 3D pharmacophore-based screening, molecular docking, and molecular dynamic simulations to identify potential compounds against the target. The selected ligand library containing 3966 antiviral compounds from the Enamine database, is screened against main protease (Mpro). The pose analysis and interactions of obtained compounds are studied using molecular docking. The root mean square deviations, fluctuations, and principal component analysis of molecular dynamics simulation are performed using the Gromacs program to monitor the motions of complexes. The 3D-pharmacophore model-based screening and docking studies identified four compounds showing significant binding affinities and stable interactions with the active site residues. The molecular dynamics simulation and component analysis identify two compounds: Z1522566619 and Z1980993192, showing the highest stability at the active site of the main protease. The promising

drug candidates listed in the study are capable of disrupting the enzyme's functionality, which will halt the SARS-CoV-2 virus progression. The potency of the repurposed compounds needs to be further explored using in vitro and in vivo experiments.

Abstract Id: PCHE/OP/29

Development of an Optimized and Validated HPLC Method for Estimation of Amphotericin B

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Abstract

The present study focuses on the development, optimization, and validation of a precise and robust Reverse-Phase High-Performance Liquid Chromatography (RP-HPLC) method for the
estimation of Amphotericin B (AmB). A Design of Experiments (DoE) approach was adopted to achieve method optimization. Initially, the Taguchi Orthogonal Array (OA) design was employed to identify the critical method parameters (CMPs) influencing chromatographic performance. These parameters were further refined using the Box-Behnken design to obtain optimal conditions. The finalized chromatographic conditions included a column oven temperature of 25 °C, a flow rate of 0.75 mL/min, and a mobile phase comprising 74.5% v/v methanol and 25.5% v/v acetate buffer (pH 4.5). Under these conditions, AmB exhibited a retention time (Rt) of 8.148 min, number of theoretical plates (NTP) of 14219, tailing factor (Tf) of 1.247, and peak area of 3407441 mV·min. The method showed excellent linearity (R 2 = 0.9996) over the range of 100-4000 ng/mL, with LOD and LOQ values of 6.67 ng/mL and 20.18 ng/mL, respectively. The developed method complied with ICH guidelines for accuracy, precision, sensitivity, specificity, and robustness. Moreover, it successfully distinguished AmB from its degradation products, confirming method specificity. This validated RP-HPLC method proved highly efficient for quantifying AmB in nanoformulations and monitoring in vitro dissolution studies, highlighting its applicability in pharmaceutical analysis and formulation development.

Keywords: Amphotericin B, RP-HPLC, LOD and LOQ

Abstract Id: PCHE/OP/30

Novel DPP-4 Inhibitor-Based Nanocarrier System: Formulation Development, Optimization, and Characterization for Alzheimer's Therapy

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Abstract:

Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by hippocampal deterioration, memory impairment, and cognitive decline. Growing evidence indicates that Type 2 diabetes mellitus (T2DM) significantly heightens the risk of developing AD through mechanisms such as insulin resistance, oxidative stress, and enhanced amyloid-β and taupathology. These shared pathways highlight the therapeutic potential of antidiabetic agents for managing or modifying the progression of AD. To design and optimize a DPP-4 inhibitor–based nanoformulation using Central Composite Design (CCD) and to assess its physicochemical and functional attributes for further studies. This study examines the preformulation aspects of AD management by evaluating the physicochemical properties of the selected drug and developing a DPP-4 inhibitor-based nanoformulation. The formulation is optimized using Design Expert software and subsequently evaluated for its vesicular characteristics. Preformulation studies provided detailed insights into the physicochemical properties of drug. It exhibited a melting

point of 202.1 °C, high solubility in methanol (55 mg/mL), very slight solubility in water (0.9 mg/mL), and a log P value of 1.65. Analytical techniques, including UV, FTIR, and DSC, confirmed the drug's structural integrity, authenticity, and purity. The optimized nanoformulation demonstrated a particle size of 137.7 nm, a PDI of 0.023, and a zeta potential of 52.4 mV, indicating a stable vesicular system. The preliminary results indicate that the optimized nanoformulation holds significant potential as a therapeutic approach for Alzheimer's disease. To substantiate these findings, comprehensive ex vivo and in vivo evaluations are currently underway to establish its safety profile and therapeutic efficacy.

Keywords: Alzheimer's disease, Type 2 diabetes mellitus, DPP-4 inhibitor, Nanoformulation.

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Pharmacognosy
Poster Presentation

Abstract Id: PCOG-PP- 01

Biological Properties and Therapeutic Potential of Camphene: A Natural Bioactive Monoterpene

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Abstract
Camphene is a naturally occurring monoterpene found in essential oils of various aromatic plants like turpentine, camphor, and ginger. It has gained growing scientific attention due to its wide range of biological and pharmacological properties. Studies have reported that camphene shows potent antioxidant, anti-inflammatory, and antimicrobial activities, making it a promising candidate for natural therapeutic applications. Its antioxidant potential helps in scavenging free radicals, thereby protecting cells from oxidative stress and associated diseases. The anti-inflammatory effects of camphene are attributed to its ability to suppress pro-inflammatory cytokines and enzymes such as COX-2 and iNOS. Moreover, camphene possesses significant hypolipidemic activity, as it can reduce plasma cholesterol and triglyceride levels, contributing to cardiovascular health. It also shows analgesic, anticancer, and antidiabetic potential through various molecular mechanisms, including modulation of signaling pathways and enzyme inhibition. Additionally, camphene's antimicrobial properties are effective against a broad spectrum of bacteria and fungi, suggesting its usefulness in food preservation and pharmaceutical formulations. Research has also explored camphene's role in neuroprotection and wound healing, broadening its therapeutic scope. Overall, camphene stands out as a bioactive natural compound with multiple pharmacological benefits and potential applications in drug development, nutraceuticals, and cosmetics. Further studies focusing on its molecular mechanisms, toxicity profile, and clinical efficacy are essential to fully establish its therapeutic potential.

Keywords: Camphene, Monoterpene, Antioxidant, Anti-inflammatory, Antimicrobial, Hypolipidemic, Pharmacological activity.

Abstract Id: PCOG-PP- 02

Antimicrobial Efficacy and Phytochemical Chemoprofiling of Medicinal Plant Extracts for Therapeutic Management of Canine Atopic Dermatitis through HPLC Analysis

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Abstract
Introduction: Atopic Dermatitis (AD), or eczema, is a common pruritic skin disorder affecting both humans and canines, often leading to self-inflicted lesions from excessive scratching and biting. Approximately 70% of dogs aged

1-3 years are affected, and the incidence is rising globally. While conventional treatments exist, there is increasing interest in alternative therapies, especially those based on traditional herbal medicine. Plants with antimicrobial properties, including flavonoids, alkaloids, and terpenoids, show promise in treating skin pathogens associated with AD.

Aim: This study investigates the antimicrobial activity of herbal plant extracts against *Staphylococcus aureus* and *Malassezia pachydermatis*, key microorganisms involved in AD. Phytochemical analysis (total phenolics, flavonoids, tannins, starch, sugars) and physicochemical properties (total ash, acid content, extractive values) were evaluated. Additionally, HPLC-based chemo-profiling was performed to identify bioactive compounds responsible for therapeutic effects.

Results: Among 15 plant extracts tested, *Psoralea corylifolia*, *Tictona grandis*, and *Artocarpus heterophyllus* exhibited the highest antimicrobial activity with significant inhibition zones. These plants were rich in bioactive compounds such as oleanolic acid, rutin, catechin, syringic acid, and kaempferol, known for their antifungal and anti-inflammatory properties.

Conclusion: The findings suggest that these herbal extracts have significant therapeutic potential for managing canine atopic dermatitis. By targeting eczema-causing pathogens and modulating inflammation, these plants could contribute to the development of novel herbal treatments for AD in dogs.

Keywords: Canine Atopic Dermatitis, *Psoralea corylifolia*, *Malassezia pachydermatis*, Antimicrobial, HPLC, Herbal Medicine.

Abstract Id: PCOG-PP- 03

The Therapeutic Potential of Clitoria Ternatea- A Review

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Abstract

Clitoria ternatea L., commonly known as butterfly pea, Shankhpushpi, or Asian pigeonwings, is a perennial herbaceous plant belonging to the Fabaceae family and widely distributed across tropical and subtropical regions including India, Malaysia, Sri Lanka, and Southern China. Traditionally revered in Ayurvedic medicine as a Medhya Rasayana (brain tonic), it has been extensively utilized to enhance memory, cognitive function, and overall neurological health. In addition to its significant role in cognitive enhancement, various parts of the plant—roots, leaves, flowers, and seeds—are employed in treating diverse ailments such as skin disorders, bronchitis, mucosal infections, and leprosy, inflammation, and throat infections. Phytochemical investigations have revealed a rich chemical profile comprising flavonoids, anthocyanins, triterpenoids, tannins, saponins, steroids, phenolic compounds, and glycosides. To date, over 57 bioactive constituents have been isolated, primarily flavanols and anthocyanins, which contribute to its characteristic deep blue flower pigmentation and pharmacological properties. Modern scientific studies demonstrate multiple therapeutic activities including antioxidant, antidiabetic, hypolipidemic, antimicrobial, anti-inflammatory, antitumor, analgesic, antiparasitic, neuroprotective, and nootropic effects. Despite its established traditional use and increasing global interest, research gaps remain in correlating its phytochemical complexity with specific mechanisms of action. This review aims to consolidate recent advancements in the chemical composition and pharmacological potential of Clitoria ternatea, providing an updated scientific foundation for its therapeutic relevance. Overall, this work highlights the promising prospects of Clitoria ternatea in modern drug development and supports the continued exploration and value addition of this traditional medicinal plant.

Keywords: Clitoria ternatea, Pharmacological action , Drug development , Herbal drugs and phytochemical constituents

Abstract Id: PCOG-PP- 04

Diosmetin: A Multifunctional Flavonoid with Broad Biological and Therapeutic Potential

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Abstract

Diosmetin is a naturally occurring **flavonoid aglycone**, primarily found in citrus fruits and various medicinal plants. It has attracted significant scientific interest due to its wide range of **biological and pharmacological properties**. Diosmetin exhibits strong **antioxidant** activity by scavenging reactive oxygen species (ROS) and enhancing endogenous antioxidant defenses, thereby protecting cells from oxidative stress. Its **anti-inflammatory** effects are mediated through the inhibition of key inflammatory mediators such as TNF-α, IL-6, COX-2, and NF-κB pathways. Moreover, diosmetin shows remarkable **anticancer** potential by inducing apoptosis, inhibiting cell proliferation, and modulating signaling pathways such as PI3K/Akt and MAPK in various cancer cell lines. Studies also demonstrate its **antimicrobial**, **antidiabetic**, and **neuroprotective** activities, highlighting its versatility as a therapeutic compound. Diosmetin has been shown to improve lipid metabolism, reduce oxidative damage, and protect cardiovascular function, suggesting potential benefits against metabolic and degenerative disorders. Moreover, its **hepatoprotective** and **anti-osteoporotic** effects further expand its pharmacological relevance. Despite its low bioavailability, efforts such as nanoformulation and complexation are being explored to enhance its therapeutic efficiency. Overall, diosmetin represents a promising natural compound with multifaceted biological properties and potential applications in drug development, nutraceuticals, and preventive medicine. Further **in vivo and clinical studies** are essential to confirm its efficacy and safety in humans.

Keywords: Diosmetin, Flavonoid, Antioxidant, Anti-inflammatory, Anticancer, Neuroprotective, Pharmacological properties.

Abstract Id: PCOG-PP- 05

Formulation and Evaluation of Neem and Tea Tree Oil-Based Herbal Antimicrobial Suppositories

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Abstract

The increasing concern over antibiotic resistance and adverse effects of synthetic agents has encouraged the development of herbal-based alternatives. This study focuses on the formulation and evaluation of herbal antimicrobial suppositories using Neem (*Azadirachta indica*) oil and Tea Tree (*Melaleuca alternifolia*) oil, prepared individually and in combination. Both oils possess strong antibacterial, antifungal, and anti-inflammatory properties, making them suitable for local antimicrobial therapy.

Formulations were developed based on methods reported in previous research on herbal suppositories. Three types of suppositories were prepared using a suitable fatty base to ensure uniformity, stability, and acceptable melting behaviour. The prepared formulations were evaluated for appearance, weight variation, melting point, hardness, disintegration time, and content uniformity as per standard pharmacopeial guidelines.

In vitro antimicrobial activity was assessed against Staphylococcus aureus, Escherichia coli, and Candida albicans. All formulations exhibited noticeable antimicrobial activity, with the combination of neem and tea tree oil showing the most significant inhibitory effect, suggesting a synergistic action of the two oils. Stability studies indicated no significant change in physical characteristics or oil content during the test period.

The study concludes that neem and tea tree oil-based suppositories represent a promising natural approach for treating localised infections. The combined formulation demonstrated superior efficacy, supporting its potential for further *in vivo* and clinical evaluation.

Keywords: Neem oil, Tea tree oil, Herbal suppository, Antimicrobial activity, Synergistic effect, Natural formulation

Abstract Id: PCOG-PP-06

Therapeutic Role of Suppositories in the Management of Heavy Menstrual Bleeding and Endometriosis

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Abstract

This abstract deals with the therapeutic role of herbal Suppositories in the management of Heavy menstrual bleeding and endometriosis. Suppositories are plug of medication intended to be inserted in an orifice other than the mouth such as vagina that melts at body temperature to deliver the desired therapeutic effect.

Herbal Suppositories provide desired action with lesser side effects. Heavy menstrual bleeding often referred to as Menorrhagia occurs due to hormonal imbalances that leads to excessive thick uterine lining or fibroids in the uterus that increases bleeding, herbs such as Gum Acacia can be used to treat it whereas Endometriosis is a disorder in which tissue like inner linings of tissue grows outside the uterus on other pelvic organs such as ovaries or fallopian tube. Herbs such as Turmeric, chamomile etc. can be used to treat the same.

Keywords: Suppositories, Endometriosis, Therapeutic effect, Menorrhagia, Fibroids

Abstract Id: PCOG-PP-07

Investigation on the pharmaceutical parameters for the evaluation of Nyctanthes arbor-tristis syrup

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Nyctanthes arbor-tristis is commonly called as Indian harshringar, Night blooming jasmine, Parijat, and Coral jasmine which belong to a family called Oleaceae. It contains a variety of phytoconstituents which are classified under the categories of glycosides, alkaloids, tannins, sflavonoids, and essential oils. Many adverse conditions particularly fever, sciatica, arthritis, diabetes, asthma, and cancer, have been reported to gain relief from it. It acts as an antimicrobial, antifungal, immunomodulatory, antipyretic, antioxidant and hepatoprotective agents. Its leaves include active ingredients called as arbortristoside -A and arbortristoside-B with effective antipyretic properties. The main purpose of this study is to eliminate hazardous synthetic compounds from herbal fever syrup by employing natural, harmless substances as the substitute to overcome the side effects such as nausea, vomiting, indigestion, headache, constipation, itching, insomnia and liver toxicity. Soxhlet apparatus was used to extract the leaves of Nyctanthes arbor-tristis with hydroethanolic solvent (1:1). The yield of the extract was found to be 12.05%. The bioactive glycosides present in leaves of Nyctanthes arbortristis is responsible for the treatment of fever in human beings.

Keywords: Nyctanthes arbor-tristis leaves, antipyretic activity, hydroethanolic solvent

Abstract Id: PCOG-PP-08

Formulation and initial characterization of an anti-ageing gel with Urtica dioica and Centella asiatica

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Abstract

Intrinsic and environmental factors such as ultraviolet exposure, oxidative imbalance, extracellular-matrix (ECM) breakdown, and cellular senescence, progressively diminish dermal collagen and elastin, producing wrinkles, dyschromia, and dryness. The objective is to develop a topical anti-ageing gel containing standardized extracts of Urtica dioica (UD) and Centella asiatica (CA) and to perform the initial physicochemical and evaluation parameters assessments. UD provides phenolic acids and flavonoids (e.g., caffeic/chlorogenic acids, quercetin) together with monoterpenes (α-/β-pinene) that contribute antioxidant and soothing actions. CA contains triterpenoids (asiatic/ madecassic series) and saponins (asiaticoside, madecassoside) associated with pro collagen signalling and tissue repair. Carbomer gels loaded with a UD–CA blend were adjusted to a skin-compatible pH (5.0–5.8), and will be evaluated for clarity, viscosity (Brookfield, 25 °C), and spreadability. In-vitro antioxidant capacity will be tested using the DPPHradical-scavenging assay. Skin tolerability will be examined via an in-vitro irritation model prior to any human testing. Optimized UD–CA gels are expected to exhibit suitable rheology and radical-scavenging activity, supporting subsequent work on skin aging. AUD–CAphytocosmetic gel is a credible early-stage strategy for anti ageing care. Standardized actives and validated methods will give a reliable result.

Keywords: anti-ageing gel; Urtica dioica; Centella asiatica; antioxidant; extracellular matrix; DPPH; topical delivery.

Abstract Id: PCOG-PP- 09

ELUCIDATION OF MECHANISTIC PATHWAY OF PHYTOCONSTITUENTS IN MANAGEMENT OF ANDROGENIC ALOPECIA

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Abstract

Androgenetic alopecia (AGA) is the most common hair loss disorder, affecting both men and women due to androgen hypersensitivity, leading to hair follicle miniaturization. Current FDA-approved treatments like finasteride and minoxidil often cause side effects such as sexual dysfunction and dermatitis. Phytoconstituents from rosemary (*Rosmarinus officinalis*) and green tea (*Camellia sinensis*), known for antioxidant, anti-inflammatory properties show promising in promoting hair growth and inhibiting DHT, but their mechanisms remain unclear. This study aimed to elucidate the active phytoconstituents, assumed targets, and underlying mechanisms of rosemary and green tea against AGA using network pharmacology. Bioactive compounds were screened from PubChem and literature. Targets were predicted via SwissTargetPrediction. AGA-related genes were collected from Gene Cards. Common targets were identified via Venn diagram. Protein-protein interaction (PPI) network was constructed using STRING and analysed in Cytoscape with CytoHubba for hub genes (top 10 via MCC). KEGG enrichment was performed in David database. Rosemary and green tea, target 212 genes in total out of which, 191 genes are implicated in alopecia, suggesting a 7% overlap between the drug's gene targets and alopecia-associated genes. This overlap indicates rosemary and green tea might influence alopecia, as there is a significant intersection of target genes relevant to the disease. Network revealed 10 hub genes some of which include STAT3, BCL2, ESR1, HIF1A. Core compounds showed involvement in hormone response, apoptosis and MAPK/HIF-1 pathway. Rosemary and green tea exert anti-AGA effects through multi-component, multi-target interactions, modulating MAPK and HIF-1 pathways, offering insights for novel, safe therapies.

Keywords: Androgenetic Alopecia; Rosemary; Green Tea; Network Pharmacology; MAPK; HIF-1

Abstract Id: PCOG-PP-10

Formulating a Multifunctional Cosmetic Serum Using Equisetum arvense Extract

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Abstract
Background: Daily photo-oxidative stress and barrier disruption drive demand for serums that address tone, texture, and early ageing without complex regimens. Equisetum arvense (horsetail) contain naturally silica and polyphenols shown to support antioxidant defense and dermal matrix maintenance. Objective: To develop a cosmetic-grade facial serum containing standardized Equisetum arvense extract and to establish its formulation integrity with bench-level biofunctional indicators. Methods: A humectant-forward, non-ionic serum base (skin-compatible pH 5.0–5.8) was engineered to solubilize and protect the botanical active. Preformulation included FTIR-guided compatibility and preservative system selection. Prototypes were characterized for appearance, pH, refractive index. Stability was challenged by centrifugation, thermal cycling, and isothermal storage at ambient and elevated temperature/relative humidity. In-vitro readouts included assays of antioxidant capacity (DPPH/ABTS) and mechanistic assays relevant to complexion and matrix homeostasis (tyrosinase and collagenase inhibition), benchmarked against placebo. Results: The optimized serum remained physically uniform under stress testing, retaining target pH and viscosity windows and exhibiting no phase separation. Extract-loaded prototypes demonstrated higher antioxidant capacity than placebo and showed favorable trends in enzyme modulation assays. Conclusion: A stable, skin-friendly serum platform can be constructed around E. arvense extract, yielding in-vitro signals consistent with multifunctional cosmetic positioning. Instrumented clinical evaluation is the logical next step.
Keywords: Cosmetic, Serum, Assays, Extract, Antioxidant

Abstract Id: PCOG-PP-11

Nanoparticle-Based Herbal Therapeutics for the Targeted Management of Chronic Obstructive Pulmonary Disease

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Abstract
Chronic obstructive pulmonary disease (COPD) is a progressive respiratory disorder characterised by airway inflammation, oxidative stress, and irreversible structural damage to lung tissue. Conventional pharmacological interventions provide symptomatic relief but fail to address the underlying pathogenic mechanisms and often result in significant adverse effects. Herbal bioactives exhibit potent anti-inflammatory, antioxidant, and immunomodulatory properties, but their therapeutic use is limited by poor solubility, low bioavailability, and inadequate targeting. This study highlights the potential of nanoparticle-based herbal therapeutics for targeted management of COPD. Findings suggest that nanoparticle-mediated delivery improves the solubility, stability, and bioavailability of herbal compounds such as curcumin, quercetin, cinnamaldehyde, eugenol, and zerumbone. These formulations enhance pulmonary deposition, prolong systemic circulation, and provide controlled release, resulting in superior anti-inflammatory and antioxidant activity compared to free compounds. Moreover, nanoformulations mitigate challenges such as rapid metabolism, systemic side effects, and poor patient adherence, positioning them as viable alternatives to conventional therapies. While preclinical outcomes are promising, translational studies and clinical trials remain limited, highlighting the need for further validation. Nanoparticle-based herbal therapeutics represent an emerging strategy for effective and targeted COPD management, offering potential to overcome limitations of current therapies and paving the way for future clinical applications.

Keywords: Oxidative stress, Airway inflammation, Functional foods, Controlled release, Bioavailability enhancement, Pulmonary nanomedicine, Airway remodelling.

Abstract Id: PCOG-PP-12

Smart Supplementation: Nutraceutical Approaches to Boost Pediatric Immunity

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Pediatric populations are more vulnerable to infections and immunological-related diseases because their immune systems are in growing stage and they are more exposed to microorganisms. Nutritional deficiencies, particularly in crucial micronutrients such as zinc, vitamin C, and vitamin D, can reduces immune responses and increase chances of illness. This poster's topic focuses mainly on the "smart supplementation"—the strategic use of nutraceuticals to boost immunity in pediatric via targeted, age-appropriate, and easy mechanisms for delivery.
Immunity-boosting nutraceuticals such as vitamin C, zinc, vitamin D, omega-3 fatty acids, probiotics, and plant-based compounds like elderberry and curcumin have been studied for their roles in both innate and adaptive immune responses. Advances in formulation science, such as nano emulsions, liposomal carriers, and flavored oral thin films, present novel techniques to improve bioavailability and compliance in children. The poster also tackles common challenges in pediatric usage of nutraceuticals, such as palatability difficulties, a lack of regulatory standards, and the risks of over-supplementation. Despite these challenges, smart supplementation provides several opportunities to improve pediatric immunity through school-based programs, fortified functional foods, and personalized formulations. Finally, nutraceuticals can play an important role in preventive pediatric healthcare.

Keywords: Neutracuticals, Pediatric, Immunity, deficiencies, Functional foods.

Abstract Id: PCOG-PP- 13

Carbohydrates, Fibers and Modified Starch: Functional roles

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Abstract
Carbohydrates, fibers and modified starches are related but distinct. Carbohydrates have several functional roles in the body particularly providing energy for bodily functions and brain. Primary functions & other important functions like energy production, Energy storage, Protein sparing, the brain, nerve cells & RBCs rely exclusively on carbohydrates for energy. Fiber and starches are complex carbs, while sugars are simple carbs. Fiber is a complex healthy carbohydrate with two types-soluble and insoluble. High fibre foods include: Beans & legumes, like black beans, peanuts, pinto beans. Fruits, Nuts and seeds, Whole grain products, vegetables. Fibers functional roles include improving digestion, bowel movement supporting Cardiovascular health by lowering Cholesterol, regulating blood sugar. Modified starches are starches that have been altered to serve specific functions in food processing such as thickening, gelling or stabilizing. Thickening and gelling, are used to thicken sauces, soups and gravies. Binding act as binders in the variety of food, including processed meats and vegetable products.

Keywords: Carbohydrates, Energy storage, brain, Fiber, Cholesterol, modified starches.

Abstract Id: PCOG-PP- 14

"Exploring the Nutritional and Antioxidant Potential of α-Carotene: A Natural Provitamin A Source"

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Abstract

1. Introduction: Carotenoids are natural pigments responsible for the yellow, orange, and red colors in many fruits and vegetables. Among them, α-carotene, a hydrocarbon carotenoid, plays an essential role as a provitamin A compound and a potent antioxidant. It is found abundantly in carrots, pumpkins, and leafy greens. Despite being structurally similar to β-carotene, α-carotene possesses unique biological and physiological properties.
2. Objective: To study the occurrence, structure, and biological importance of α-carotene and to highlight its health-promoting and antioxidant potential.
3. Methodology: A comprehensive literature review was conducted using scientific databases to collect information on the structure, sources, and biological functions of α-carotene. Data were analyzed and compared with β-carotene to evaluate its antioxidant potential and provitamin A activity. Key findings were summarized and represented through tables and graphical illustrations for clear visualization.
4. Results and Discussion: α-Carotene exhibits approximately 50% of the vitamin A activity of β-carotene and contributes significantly to oxidative stress reduction. It supports vision, immune function, and skin health. Regular dietary intake is linked to a lower risk of chronic diseases, including cardiovascular disorders and certain cancers.
5. Conclusion: α-Carotene serves as a valuable dietary antioxidant and provitamin A source, emphasizing its potential use in functional foods, nutraceuticals, and health supplements. 6. Keywords: α-Carotene · Provitamin A · Antioxidant · Carotenoids · Nutraceuticals

Abstract Id: PCOG-PP-15

Next Generation Probiotics and Postbiotics: Modulating the Gut Brain Axis in Alzheimer's Disease

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Abstract:

Background: Alzheimer's disease is a progressive neurodegenerative condition involving cognitive impairment, amyloid- β deposition, inflammation and oxidative stress. The gut brain axis is important for neurological health with gut microbiota affecting brain function through immune, metabolic, and neuronal mechanisms. Probiotics have been known to modulate gut microbiota and enhance cognitive effects in Alzheimer's disease for a long time.

Purpose: This review evaluates the potential of next-generation Probiotics and Postbiotics in Alzheimer's disease, focusing on their neuroprotective mechanisms, safety, preclinical efficacy and translational prospects.

Method: We conducted a comprehensive literature search using databases such as PubMed, Google Scholar, Scopus, focusing on studies published up to 2025. Relevant Preclinical and clinical studies were screened and data on mechanism, efficacy and translational potential was summarised

Result: Evidence indicates that Next-generation probiotics restore gut microbial equilibrium, decrease pro-inflammatory cytokines, promote mitophagy and fortify intestinal and Blood brain barrier. These actions enhance cognition, decrease amyloid- and tau pathology and safeguard neurons. Postbiotics have comparable neuroprotective actions with additional benefits of stability and ease of standardization

Conclusion: Modulation of the gut-brain axis through Next-generation probiotics and postbiotics is a promising multi-targeted approach for Alzheimer's disease, conferring neuroprotection and potentially disease-modifying effects. Future research will include the creation of targeted NGP strains, isolation of neuroactive postbiotic compounds, concurrent use of microbiome-derived therapies with standard treatment of AD, and tailoring interventions according to personalized gut profiles. These strategies can potentially boost cognitive performance, retard disease progression, and enhance quality of life for AD patients.

Keywords: Alzheimer, Gut, Brain, Probiotics, Prebiotics

Abstract Id: PCOG-PP-16

Mind, Mood, and Molecules: Unlocking the Antidepressant Power of Nutraceuticals

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Abstract:

Depression is a common psychiatric mental disorder characterized by depressed mood or loss of pleasure or interest in activities for long periods of time. Antidepressant drugs include Selective Serotonin Reuptake Inhibitors (SSRIs), Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs), and Tricyclic Antidepressants (TCAs). Their side effects like weight gain, sexual problems, gastrointestinal upset etc. and inconsistent influence on inflammation, oxidative stress, and neuroplasticity have driven interest in nutraceuticals, which show the potential to regulate these mechanisms in a safer manner and with increased tolerability. Natural compounds like plant extracts, omega-3s, and other bioactive molecules that work through multiple brain pathways. Recent studies and reviews suggest that EPA-rich omega-3s, saffron, curcumin, Sadenosylmethionine (SAMe), and ashwagandha can help ease depression symptoms, often enhancing the effects of standard antidepressants and, in milder cases, showing promise as safe and effective stand-alone options. Inflammation reduction and improvement of neural connectivity is the direct result of omega-3 fatty acids supplementation which are EPA-rich (Eicosapentaenoic Acid). Saffron and curcumin improve the activity of serotonin and exhibits anti-inflammatory effects. SAMe (S-adenosylmethionine) fosters the synthesis of important mood regulating neurotransmitters and adaptogens like ashwagandha help control stress hormones and improves emotional resilience. However, various clinical trials and studies are required to standardize various formulations and dosage forms. Our paper highlights the side effects associated with antidepressants and emphasizes the potential benefits of combining them with nutraceuticals to enhance efficacy and reduce adverse effects. Overall, various latest evidence shows that nutraceuticals are the well knows and effective way to manage various mental ailments like depression and other mental health disorders.

Keywords: Depression; Nutraceuticals; Omega-3 fatty acids; Saffron; Curcumin; Sadenosylmethionine (SAMe); Ashwagandha

Abstract Id: PCOG-PP-17

Ashwagandha as a Neuroshield: A Natural Defense Against Parkinson's Disease

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Abstract

Parkinson's disease (PD) is the second most common neurodegenerative disorder globally, marked by the progressive loss of dopaminergic neurons in the substantia nigra and motor impairments such as tremors, rigidity, and bradykinesia. The pathological hallmarks include oxidative stress, mitochondrial dysfunction, neuroinflammation, and abnormal α-synuclein aggregation. Withania somnifera, a key herb in Ayurveda, is traditionally used as a Rasayana for improving nerve function, stress resistance, and cognitive ability. It contains bioactive constituents such as withanolides known for strong antioxidant and neuroprotective properties. Objectives To extract and analyze the major phytochemical constituents of Withania somnifera roots relevant to neuroprotection. To evaluate antioxidant, anti-inflammatory, and neuroprotective effects of the extract using laboratory models of Parkinson's disease. Methodology: Roots of Withania somnifera were collected, authenticated, dried, powdered, and subjected to extraction. The extract was analyzed for major phytochemicals such as withanolides and alkaloids using HPTLC and HPLC techniques. Antioxidant and anti-inflammatory activities were assessed through in vitro assays. Neuroprotective effects were further evaluated in PD animal models, where outcomes such as dopamine level restoration, oxidative stress reduction, and improvement in motor functions were recorded. Result: Phytochemical screening confirmed the presence of

withanolides, alkaloids, and sitoindosides, with HPLC analysis indicating high withanolide content.The extract demonstrated strong antioxidant activity. Discussion Withania somnifera root extract demonstrated promising therapeutic actions relevant to Parkinson's disease, driven by its withanolide-rich phytochemical profile. Its antioxidant and anti-inflammatory mechanisms appear to protect dopaminergic neurons from degeneration, while also improving motor outcomes in PD models.

Keywords: Withania somnifera, Parkinson's disease, neuroprotection, Withanolides

Abstract Id: PCOG-PP-18

IN-SILICO SCREENING OF CAESALPINIA DIGYNA AGAINST THE THERAPEUTIC TARGETS OF TYPE -2 DIABETES MELLITUS

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Abstract:
Insulin is an essential anabolic hormone that exacts multiple effects on glucose, lipids, protein and mineral metabolism. Diabetes is an immune disorder disease that leads to the destruction of insulin producing pancreatic beta cell. Associated side effect with the current treatment is the major setback which affecting therapeutic compliance. In this work, we aimed to explore the therapeutic potential of C. digyna Phytoconstituents against diabetes. C. digyna belonging to Fabaceae family. It has (Caesalpinia digyna) numerous medicinal values such as antipyretic effects, anti-inflammatory, antioxidant, and some other properties of plant is proved by published literature. This study used an in-silico analysis to look into the anti- diabetic properties of C. digyna Phytoconstituents. Methodology: The binding energy of C. Digyna Phytoconstituents with Glucosidase (Iv4s), Hepatocyte nuclear factor 4 A (HNF-4A) (4B7W) was investigated. The Lipinski rule of five should be followed by all ligands; these rules are (1) no more than seven hydrogen bond donors, (2) no more than ten hydrogen bond acceptors, (3) a molecular weight below 500 daltons, (4) a low partition coefficient, and (5) a log P value of less than five. Autodock Vina 1.5.7, was used for the Insilco approach to examine ligand protein interaction. The protein structure was obtained from the protein database bank (PDB), while the ligand structure was gathered using the PubChem programmed. These plant-based natural compounds were used in molecular docking studies to analyses the target protein and ascertain the antidiabetic efficacy of C.digyna. Conclusions: The selected Phytoconstituents of the C. Digyna have established high binding affinity to target protein. Further invitro and invivo Studying is necessary to explore the pharmacological potential of C. digyna Phytoconstituents in antidiabetic in future.

Keywords: Diabetes, C. digyna (Caesalpinia digyna), Type 2 diabetes mellitus (T2DM) Glucokinase, Insulin like growth factor-1 (IGF-1), Hepatocyte nuclear factor-4A, Insulin

Abstract Id: PCOG-PP-19

Integrating Tradition: Safe and Effective Herbal Solution for Modern Diabetes Care

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Abstract:
Diabetes mellitus (DM) is a multifactorial metabolic disorder characterized by chronic hyperglycemia due to insulin deficiency, resistance, or both. Its global incidence is rising alarmingly, contributing to severe complications affecting the heart, kidneys, nerves, and eyes. Although conventional anti-diabetic drugs such as insulin and oral hypoglycemics are effective, they are often associated with side effects, high costs, and reduced patient compliance. Despite the

availability of various synthetic antidiabetic drugs, long-term use often leads to undesirable side effects, driving increasing interest in herbal and Ayurvedic alternatives.Therefore, there is growing interest in Ayurvedic herbal formulations as safer, more sustainable alternatives. The investigation involves determining bioactive constituents, evaluating anti-diabetic efficacy in experimental models, and assessing potential toxicity following standard pharmacological guidelines. Comparative analysis will help determine the most efficacious and safe formulation among the drugs. Ayurvedic herbal formulations have gained increasing attention for their holistic, multi-targeted approach and reduced toxicity. The expected outcome of this research is to establish a scientific basis for the traditional Ayurvedic use of these formulations, contributing to evidence-based validation of herbal medicine. Furthermore, the study seeks to promote integrative medicine by bridging traditional Ayurvedic knowledge with modern pharmacological science, ultimately providing a safe, effective, and affordable alternative for diabetes management.

Keywords: Ayurveda, anti-diabetic, herbal formulation, STZ-induced diabetes, Hyperglycemia

Abstract Id: PCOG-PP-20

To study the medicinal properties of Calotropis Gigantea for the treatment of various diseases.

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Abstract:
Since ancient times, people have utilized plants as the foundation for medical treatments, and traditional medicine is still widely practiced today. Numerous plants possess ultimate pharmacological action. Traditional herbal remedies are becoming increasingly prominent in global health discussions and serve an important role in the management and treatment of diseases. . It is a tiny tree or shrub with laticiferous qualities and a barren or hoary appearance. The common names for it include "swallow-wort" and "milkweed." Traditional medicine frequently makes use of the plant species Calotropis. Examined are Calotropis gigantea's systematic position, common names, vegetative traits, ecology, distribution, phytochemistry, and economic advantages. Folk medicine has long used the Asclepiadaceae perennial herb Calotropis gigantea. Numerous chemical compounds, such as cardiac glycosides, flavonoids, terpenoids, alkaloids, tannins, and resins, have been extracted from this plant. Calotropis gigantea, is a member of the Asclepiadaceae family and has long been utilized in traditional medicine. Analgesic, antipyretic, central nervous system (CNS), anti-inflammatory, procoagulant, anti-diarrheal, free radical scavenging, antimicrobial, anti-tumor, antifungal, antitussive, and antifeedant activities are among the pharmacological activities reported for the compounds under investigation. Several of its pharmacological effects are caused by stigmasterol, sitosterol, and pregnanone. Calactin, calotropagenin calotoxin, proceroside, syriogenine, uscharidin, voruscharin, uzarigenin, uscharin, and lavonol glycosides are the subsequent cardenolides that have been documented in earlier research.

Keywords: Calotropis gigantea, Crown flower, Sweta Arka, Giant Milkweed, Potential herb, Crown flower, Pharmacological activity,

Abstract Id: PCOG-PP-21

A comprehensive review on formulation and evaluation of emulgel that contain synthetic drug and Herbal oils for fungal infections

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Abstract:

Topical fungal infections are common and clinically significant worldwide, highlighting the development of improved treatment strategies. due to increasing resistance, poor skin penetration, and limited efficacy of conventional topical therapy. Nanoemulgel systems, which are hybrid formulations combining nanoemulsions with gel matrices, have emerged as a promising strategy to overcome these limitations by enhancing drug solubility, skin permeation, and therapeutic retention. Fungal infections are the most common and often difficult to treat, especially when medicines do not reach deep into the skin or lose their effect over time. Synthetic agents such as clotrimazole, terbinafine, and ketoconazole exhibit strong antifungal activity; however, their use is limited by poor aqueous solubility and limited skin permeation. Herbal oils such as tea tree, clove, and eucalyptus oils, and many other oils, not only provide antifungal properties but also act as natural permeation enhancers, improving drug delivery across the stratum corneum top layer of [epidermis]. Key formulation parameters, including oil phase selection, surfactant/co-surfactants, humectants, PH adjusters, Polymers, Binders, and other chemicals, were carefully selected in terms of their quantity/ratio, and the best formulation was optimized. The formulation of nanoemulgel improves uniform drug dispersion, controlled release, and enhanced bioavailability, while the gel base ensures patient-friendly application and prolonged retention. This review is based on the available data from recent preclinical and clinical studies, evaluating formulation parameters, including droplet size, zeta potential, viscosity, spreadability, and in vitro/ex vivo permeation profiles.

Keywords: Topical antifungal infection, Nanoemulgel, Stratum corneum, synthetics drugs, Herbal oils, Controlled drug release, etc.

Abstract Id: PCOG-PP-22

Fermentation of Ginger: A Pathway to Improved Digestive Function

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Abstract:

Introduction: Zingiber officinale, commonly known as ginger, is a traditional medicinal rhizome renowned for its digestive, anti-inflammatory, and antioxidant properties. Rich in bioactive compounds such as gingerols, shogaols, and zingerone, ginger plays a crucial role in gastrointestinal health. Fermentation enhances its biochemical profile, increasing bioavailability and producing beneficial metabolites such as organic acids and probiotics that may further promote gut health and digestion. Objectives: A comprehensive study integrating fermentation process optimization, phytochemical analysis, and in vitro assays was undertaken to evaluate the impact of fermentation on the digestive potential and bioactive composition of Z. officinale. Methods: Fresh ginger was subjected to lactic acid fermentation using Lactobacillus plantarum under controlled anaerobic conditions. Pre- and post-fermentation extracts were analyzed for total phenolic and flavonoid content. UV, HPLC, HPTLC and TLC profiling were performed to identify changes in key bioactives. Results and Discussion: Fermentation of Z. officinale with Lactobacillus plantarum significantly enhanced its total phenolic and flavonoid content, indicating microbial conversion of native compounds into more bioactive forms. HPLC and TLC analyses showed the appearance of new peaks corresponding to low-molecular-weight phenolics and organic acids. These metabolites contributed to a notable increase in antioxidant capacity. Fermentation enhanced both the phytochemical profile and functional efficacy of ginger, supporting its value as a fermented nutraceutical ingredient. Conclusion/Recommendation: The findings demonstrate that fermentation augments the phytochemical richness and digestive efficacy of ginger, validating its use as a functional fermented food ingredient. Further studies at the preclinical and clinical levels are recommended to confirm its potential in promoting gut health.

Keywords: Zingiber officinale, Lactobacillus plantarum, fermentation, digestive potential, probiotics, ginger

Abstract Id: PCOG-PP-23

Formulation and Evaluation of Herbal Cough Syrup by Extraction Method

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Abstract:
The formulate and evaluation of poly herbal cough syrup is a extract by maceration method. The different plant using are such as horse chestnut, piper longum, tulsi, clove and bay leaf. Thus, the different part is use leaves, root and the aerial part. The cough is most problem if are people for children, adult and old person. Polyherbal cough syrup may be different present of traditionally used for anti-tussive, anti-pyretic, anti-inflammatory and anti-bacterial are property. The evaluate of the parameter such as pH, colour, odour and the viscosity during the evaluate formulate the stable and ready to use of polyherbal syrup for the respiratory problems. Thus, the formulate of poly herbal cough syrup for 100 ml of syrup. This plant using are such as horse chestnut, piper longum, tulsi, clove and bay leaf. It is the extract of ethanol and the N- hexane extract by the maceration method (kept the overnight). Then the different quantity is the extract obtained for 3%,5% and 10%. It is prepared are the simple syrup are the medicated to be added the different quantity of the extract and the preservative. Then added the flavouring agent are peppermint oil. If the more effective and safety are poly herbal cough syrup. The completed formulation of poly herbal cough syrup is a safety and effective are using the plant. Thus, the evaluate the parameter are pH, colour, test, viscosity and the solubility in the polyherbal cough syrup. The study is present using of plant is anti-tussive, antipyretic and anti-inflammatory, antiviral property relief the cold and cough. The ancient people are using various medicinal plant are the aerial part of leaves and the root for the various treatment for diseases. Which is the various action and the acute or chronic cough. Which are having a lot of side effect.
Keywords: horse chestnut, antitussive, anti-inflammatory, clove, anti-pyretic, anti-microbial etc.

Abstract Id: PCOG-PP-24

Development and Assessment of Herbal Shampoo as a Safe Alternative to Synthetic Shampoos that Contain Potentially Carcinogenic Chemicals

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Abstract:
Shampooing frequently keeps our scalp clean and dandruff free. Synthetic shampoos contain paraben, SLS/SLES and dyes that can cause frizziness, drying, moisture loss and has been linked to carcinogenicity and long-term toxicity, whereas herbal shampoos provide nourishment, reduce dandruff and hair fall. This research highlights use of Amla, Reetha, Shikakai, Neem, Aloe-vera, Hibiscus, Kalonji & Tea tree oil in shampoo formulations. The main objective is to formulate and evaluate a sulphate and paraben free shampoo that cleanses hair, controls dandruff and provides good foam. Selected herbs are collected and authenticated, then extracted using water or other solvents by boiling, cooling and filtration, and then stored at low temperature. Extracts are weighed and mixed with preservatives and pH adjuster and stored for further analysis. The formulated herbal shampoo exhibits desirable physicochemical properties, foaming, cleansing, acceptable viscosity and dandruff control. Herbal shampoos formulated with natural ingredients provides eco-friendly alternative to the synthetic shampoos.

Keywords: Shikakai, Neem, Aloe-vera, Sulphate-free, Paraben-free, Anti-dandruff

Abstract Id: PCOG/PP/25

From Kitchen to Clinic: Ginger's Journey as a Potent Anti- Inflammatory Agent"

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Poster Presentation (online)

Abstract:

Background: Ginger (Zingiber officinale) has been widely used in traditional medicine for its medicinal properties, including anti-inflammatory effects. The bioactive compounds present in ginger, such as gingerol and shogaol, have been shown to possess potent anti-inflammatory properties, making it a potential therapeutic agent for various inflammatory diseases.

Objective: The objective of this study is to explore the potential therapeutic applications of ginger's anti-inflammatory properties and to elucidate the mechanisms of action involved in its anti-inflammatory effects.

Methods: A comprehensive review of existing literature on ginger's anti-inflammatory effects was conducted. Relevant studies investigating ginger's bioactive compounds and mechanisms of action were analysed. Data were extracted and synthesized to elucidate ginger's potential therapeutic applications.

Results: The results of this study demonstrate that ginger's bioactive compounds, such as gingerol and shogaol, inhibit pro-inflammatory enzymes and cytokines, reducing inflammation. The anti-inflammatory effects of ginger are attributed to its ability to modulate various signalling pathways, including the NF-κB pathway.

Conclusion: Ginger's anti-inflammatory properties have potential therapeutic applications in various inflammatory diseases, including arthritis and osteoarthritis. Further studies are needed to fully elucidate the mechanisms of action and to explore the potential benefits of ginger in various inflammatory conditions.

Keywords : Ginger, Anti-inflammatory, Gingerol, Shogaol, NF-κB pathway, Inflammatory diseases, Therapeutic applications.

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Pharmacognosy
Oral Presentation

Abstract Id: PCOG-OP- 01

Standardization of Homoeopathic Drugs: A Pharmacopoeial Perspective

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Abstract:
This systematic review provides a critical analysis of standardization processes related to homoeopathic medicines by conducting an in-depth evaluation of pharmacopoeia frameworks, regulatory processes, and meta-analysis results. Emphasis is placed on the methodologies guiding the formulation, quality control, and safety assessment of homoeopathic medicines, with a comparative lens on major pharmacopoeias such as the Indian Pharmacopoeia, European Pharmacopoeia, and the Homeopathic Pharmacopoeia of the United States. Significant results show that while pharmacopoeias establish parameters in relation to identity, purity, potency, and microbial and heavy metal levels and insist upon Good Manufacturing Practice (GMP) compliances, some challenges exist in particular standardizing at high dilutions where conventional analysis procedures often cannot detect active ingredients Discrepancies in dilution methods, alcohol content, labeling, and excipient profiles continue to interfere with the universal quality benchmarks. Markers-based standardization, bioassay-driven assessments, and physicochemical analyses in recent years have contributed to the scientific field; however, worldwide standardization is hindered by differences in regulatory requirements and inequalities in resources. Meta-analysis reveals variability in efficacy outcomes and finds reporting biases in homoeopathic treatment clinical appraisals. Risk-based regulatory interventions, efficient pharmacovigilance, and centralized schemes of adverse event reporting are identified as crucial. This review highlights the importance of evidence-based analytic innovations, regulatory alignment and transparent clinical assessments to ensure safety, uniformity, and worldwide acceptance of homoeopathic products. Strategic funding of multi- and inter-disciplinary studies and international policy planning is key in upgrading standardization and scientific credentials of the homoeopathic pharmaceutical industry.

Abstract Id: PCOG-OP- 02

PHARMACEUTICAL EVALUATION OF NATUROPATHIC THERAPIES FOR OSTEOARTHRITIS MANAGEMENT: FROM ANCIENT WISDOM TO MODERN METHODOLOGIES

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Abstract
Naturopathic therapy draws upon age-old practices. Its use is increasing on accounts of OA positive response to modern drugs and clinical research. With the modern focus on OA and its therapy, adaptations of naturopathic practices have begun to modern pharmaceutical research. These include incorporation of herbal therapy, dietary supplements, and physiotherapeutic techniques, which include the use of mud compresses, hydrotherapy, massage, yoga, and other dietary changes. Research shows analgesic and functional benefits of OA management for herbal

therapy. For example, one meta-analysis of 10 studies on OA management using naturopathic practices showed a considerable one on the Visual Analogue Scale (VAS) pain measurement with pain improvement SMDs from 0.98 to 1.08 (95% CI: 0.72–1.44) and above 1 on 95% CI. In addition, randomized control trials have shown effectiveness on OA of homeopathic individualized orders and a significant improvement on the 3 month total using the WOMAC index (p < 0.05). New approaches have begun to consider the combination of stem cell therapies in regenerative medicine, innovative drug delivery methods, and the development of highly standardized methods to improve reproducibility, safety, and overall standards. Clinical studies have started focusing on natural therapies as boswellia (Boswellia serrata), ginger (Zingiber officinale), turmeric (Curcumin longa), and eggshell membrane have been able to demonstrate symptom alleviation and safety of use in comparison to synthetic drugs. There is remarkable variability in the studies, but there is enough evidence of the potential role of naturopathic approaches to improve the management of OA, and more definitive studies need to be done in places that formally recognize these therapies.

Keywords: Osteoarthritis, Naturopathic Therapies, Hydrotherapy, Phytotherapy, Pharmacognosy.

Abstract Id: PCOG-OP- 03

Herbal approaches for diuretics therapy and limitations of Conventional Drugs

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Abstract

Polyherbal approaches have gained increasing attention in the realm of diuretic therapy, particularly as a complementary strategy to conventional pharmacological interventions. This abstract explores the efficacy and safety of diverse herbal drugs that leverage synergistic effects when combined to form multiple plant extracts as diuretics, highlighting their potential advantages over single-drug therapies. The limitations of conventional diuretic drugs include adverse side effects, tolerance development, and electrolyte imbalances, suggest the need for alternative solutions. Recent studies indicate that polyherbal combinations, often possessing antioxidant and anti-inflammatory properties, may minimize these risks while enhancing therapeutic outcomes. Additionally, this review delves into the biochemical mechanisms underpinning the diuretic action of selected herbal components, providing insights into their pharmacodynamics. The collective evidence suggests that integrating polyherbal therapies could offer a holistic approach for managing conditions associated with fluid retention, thereby shaping future clinical practices. However, rigorous clinical trials and standardization of formulations are essential to substantiate these findings and ensure patient safety. The exploration of polyherbal diuretics not only reflects a traditional understanding of natural remedies but also aligns with contemporary trends in personalized medicine and holistic care.

Keywords: Herbal, Diuretic therapy, Limitations of Conventional diuretic drugs, Traditional Crude drugs

Abstract Id: PCOG-OP- 04

Ethnopharmacological Use of Medicago polymorpha: An Updated Review

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Abstract

Medicago polymorpha L. (syn. Medicago denticulata) is a wild edible herb from the Fabaceae family that grows in agricultural and disturbed areas. Traditionally recognized for both nutritional and therapeutic benefits, it has been used

throughout numerous cultures to treat problems such as constipation, diabetes, skin infections, and liver abnormalities. This review gathers and updates existing ethnopharmacological, phytochemical, and pharmacological findings on M. polymorpha. The plant contains a variety of bioactive elements including as phenolic acids, flavonoids, isoflavones, saponins, and volatile oils, the most abundant of which is hexadecanoic acid. Pharmacological studies have found several biological activities—analgesic, antioxidant, hepatoprotective, antibacterial, cytotoxic, anthelmintic, antiamnesic, antidiarrheal, and immunomodulatory effects—which support its traditional usage. Saponin fractions revealed considerable anthelmintic activity, while methanolic extracts inhibited α-amylase, suggesting an antidiabetic effect. Furthermore, the manufacture of silver nanoparticles using M. polymorpha extract has demonstrated promising antibacterial and catalytic capabilities, connecting phytochemistry and nanotechnology-based treatments. The safety profile derived from acute toxicity investigations reveals non-toxic behavior up to 2000 mg/kg.Overall, M. polymorpha is an invaluable ethnopharmacological resource with numerous therapeutic applications. This comprehensive study stresses the importance of sophisticated pharmacological validation, bioassay-guided isolation, and clinical research in converting this ancient medicinal plant into promising modern phytotherapeutics.

Keywords: *Medicago polymorpha*, ethnopharmacology, phytochemistry, pharmacological activities, traditional medicine, silver nanoparticles

Abstract Id: PCOG-OP- 05

Biological assessment of phyto extract in inhibition of heat induce protein denaturation

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This project target to analyze the anti-inflammatory properties of the selected phytoextract by examining their capacity to inhibit heat induced protein denaturation. The inflammation shows involves the denaturation of protein which leads to tissue damage that show symptoms like pain and redness. There are various commonly used anti-inflammatory agents such as NSAIDs available in the market that prevent denaturation of protein and provide relief from inflammation but due to prolonged use they cause adverse effects such as gastric ulcer therefore the plant based medicine is growing interest in modern medicine. In this project the protein denaturation plays a vital role in examine anti-inflammatory activity whereas the phytoextract are the safer alternative of synthetic drug followed by the calculating the percent of inhibition of protein denaturation. The phytoextract demonstrate significantly concentration dependent inhibition of protein denaturation that shows the presence of phyto compounds which prevent protein denaturation. This in-vitro study support to identify effective herbal preparation with pharmacological effect on inflammation.

Key words: Inflammation, NSAIDs, Protein denaturation, In- Vitro

Abstract Id: PCOG-OP- 06

From Natural Extracts to Topical Medicine: In-Vitro Characterization of a Herbal Gel for Dermatological Therapy

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Abstract

The increasing interest in sustainable and biocompatible dermatological formulations has resulted in greater focus on utilizing natural bioactive materials and adopting green pharmacy applications. The present study focuses on developing and in-vitro characterising an herbal gel prepared by exploring standardized plant extracts for dermatological applications. The chosen herbal extracts were incorporated into a gel formulation based on carbopol matrix, utilising friendly excipients in the process. The formulated product was evaluated in terms of important

physicochemical properties: pH, viscosity, spreadability, homogeneity and stability. The microbiological testing was performed to elucidate the gel's ability for therapeutic use. The results showed that the product's pH was suitable for use on the skin, it had uniformity in texture, and stable rheological properties. The microbiology testing showed a good result for future use in dermatology. Further studies demonstrated a promising potential for a safe, effective and sustainable topical dosage form for the management of dermatological disorders. This study demonstrated the efficacy for the utilization of natural extracts as a transition of sustainable practice, to modern drug delivery systems that align with green pharmacy principles and "From Molecule to Medicine".

Keywords: Dermatological, Biocompatible, Bioactive, Rheological, In-vitro.

Abstract Id: PCOG-OP- 07

Emerging Role of Plant-Derived Bioactives in Modulating Neuroinflammation and Oxidative Stress Pathways in Epilepsy

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Abstract

Background: Epilepsy is a neurological complication in the form of frequent seizures or disorders caused by neuronal abnormal excitability. Traditional antiepileptic medication offers only symptomatic but not effective control of the underlying neuroinflammatory and oxidative pathways that cause neuronal injury and disease development. These constraints point to the urgency of developing safer and multi-targeted approaches to therapy.

Objective: To investigate and summarize the mechanistic contribution of bioactive compounds derived from plants to regulating neuroinflammation and oxidative stress responses related to epilepsy.

Methods: Databases such as PubMed, Scopus, and ScienceDirect were used to develop a comprehensive literature review. The critical analysis of the studies conducted on the neuroprotective, antioxidant, and anti-inflammatory properties of phytoconstituents in experimental and clinical models of epilepsy was carried out.

Results: Bioactives in plants like flavonoids, alkaloids, terpenoids and phenolic acids showed considerable neuroprotective activity by regulating inflammatory mediators (NF-kB, TNF-a, IL-1b, COX-2) and increasing antioxidant enzymes (SOD, CAT, GSH). The curcumin, resveratrol, and quercetin compounds were found to restore redox balance, decrease neuronal apoptosis, and control the seizure condition in preclinical trials.

Conclusion: Phytoconstituents have multi-target qualities to reduce neuroinflammation and oxidative stress to provide new therapeutic perspectives on the management of epilepsy. Further development of nanocarrier-based delivery systems by incorporating future research on how to make them more brain bioavailability could increase their translational potential.

Keywords: Epilepsy; Herbal bioactives; Neuroinflammation; Neuroprotection; Oxidative stress; Phytoconstituents.

Abstract Id: PCOG-OP- 08

Extraction and Evaluation of Cinnamic Acid-Based Semi-Synthetic Derivative for its Anti- Diabetic Activity in Wistar Rats

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Abstract

This study aimed to extract cinnamic acid from the bark of *Cinnamomum cassia* and evaluate the anti-diabetic activity of its semi-synthetic derivative. Initially, 10.5 mg of purified cinnamic acid crystals were successfully isolated from 150 g of cinnamon bark powder using methanol extraction. Molecular docking revealed that the derivative exhibited

superior binding scores (-3.446 to -2.862) with α-amylase (PDB ID: 4W93) compared to the reference drug metformin (-1.12). Result formed the semi-synthetic derivative, 2-methyl-4-oxo-3-phenyl-6,7-dihydro-4H-chromen-7-yl cinnamate. The structure was confirmed using nuclear magnetic resonance (NMR), infrared spectroscopy (IR), and mass spectrometry (MS). Preformulation studies confirmed the gel's suitability.

In streptozotocin (STZ)-induced diabetic Wistar rats, oral administration of a 10 mg/kg dose significantly surpassed the 5 mg/kg dose in reducing fasting blood glucose and enhancing glucose tolerance ($p < 0.001$). Histological analysis confirmed greater pancreatic β-cell regeneration at the higher dose. Topically, the 2 g gel formulation promoted wound healing more effectively than the 1 g formulation in both diabetic and non-diabetic models, achieving faster re-epithelialization and complete closure within 21 days. In conclusion, the cinnamic acid-based semi-synthetic derivative shows notable anti-diabetic and wound-healing effects, offering a promising new therapy for diabetes and associated complications.

Keywords: Cinnamic acid, semi-synthetic derivative, anti-diabetic activity, streptozotocin-induced model, molecular docking, wound healing.

Abstract Id: PCOG-OP- 09

Evaluation of the Genotoxicity of Herbal Medicinal Plants

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Abstract

One of the main causes of death in the globe is cancer. The environment contains a variety of genotoxic and carcinogenic compounds that can either directly or indirectly impact genetic material. The substances that can harm genetic material are called genotoxins, and they are categorized as either teratogens, carcinogens, or mutagens according on how they work. A number of chronic degenerative diseases, such as hepatic, neurological, and cardiovascular conditions, arthritis, various cancers, and chronic inflammation, are also influenced by toxins. According to OECD recommendations, it is crucial to evaluate the genotoxic potential of a medical plant extract or other product using the Comet assay, Micronucleus assay, chromosome aberration test, and Ames test before utilizing it as a therapeutic agent. Even though every toxicological experiment has a lot of unknowns and debates, they all contribute to human safety. Therefore, before using any herbal product, it is always necessary to detect the Geno toxicants and then take the appropriate steps for their cleaning.

Keywords: Genotoxicity, Comet assay, Micronucleus assay, Chromosome aberration test, Ames test, Medicinal plants.

Abstract Id: PCOG-OP- 10

Pharmacognostic and Physicochemical Standardization of Argyreia nervosa (Burm. f.) Bojer roots for Quality Assessment of Crude Drug

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Abstract

Quality evaluation of medicinal plants forms a vital component in the development of reliable herbal formulations. This study presents a detailed pharmacognostic and physicochemical investigation of the roots of *Argyreia nervosa*

(Burm. f.) Bojer, commonly known as Vṛddhadaru, belonging to the family Convolvulaceae, to establish reliable parameters for crude drug quality assessment. In Ayurveda, the plant is recognized for its therapeutic role in managing Kapha disorders, inflammatory conditions, arthritis, synovitis, and seminal debility. Considering its wide therapeutic applications and availability of limited systematic data on its pharmacognostic and physicochemical characteristics, a detailed evaluation of the plant roots is necessary to ensure authenticity, purity, and consistency of the crude drug. drug.

Comprehensive pharmacognostic analysis was performed, including macroscopic, microscopic, and micrometric characterization, to document diagnostic features for proper identification and authentication. Physicochemical investigations, performed following standard laboratory procedures to determine total ash, acid-insoluble ash, water- and alcohol-soluble extractive values, loss on drying, foaming index, etc., were evaluated to determine the quality and purity of the drug. Preliminary phytochemical screening of root extracts revealed the presence of secondary metabolites including terpenes, flavonoids, steroids, phenols, and tannins, which are indicative of the plant's pharmacological potential.

The comprehensive data obtained from this study provide baseline reference values for the standardization of *A. nervosa* root and ensure the authenticity of the crude drug used in Ayurvedic and phytopharmaceutical preparations. These findings support the implementation of effective quality control measures for herbal formulations containing *A. nervosa* as an active component, ensuring therapeutic reliability and reproducibility in clinical use.

Keywords: *Argyreia nervosa*, Vṛddhadaru, pharmacognostic evaluation, physicochemical analysis, phytochemical profiling, quality standardization.

Abstract Id: PCOG-OP- 11

Emerging Trends in Antifungal Herbal Therapies and Formulation Strategies: A Review

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Abstract-

Fungal infections represent a growing global health threat, driven by rising antifungal resistance, immunocompromised populations, and limited therapeutic options. The current review synthesizes recent evidences on the significance of antifungal herbs as viable alternatives or adjuncts to conventional antimycotics. We examine medicinal plants from diverse phytochemical classes—terpenoids, phenolics, alkaloids, and essential oils—highlighting key examples such as garlic (*Allium sativum*; allicin disrupts membranes and biofilms), neem (*Azadirachta indica*; azadirachtin targets dermatophytes), turmeric (*Curcuma longa*; curcumin inhibits ergosterol and efflux pumps), oregano (*Origanum vulgare*; carvacrol/thymol MICs 0.1–0.5 mg/mL), and tea tree (*Melaleuca alternifolia*; terpinen-4-ol for topical dermatophytosis). Mechanisms include membrane disruption, ergosterol inhibition, efflux pump blockade, and biofilm suppression. *In vitro* and *in vivo* studies demonstrate potent activity against *Candida albicans*, *Aspergillus* spp., *Cryptococcus neoformans*, and dermatophytes, often with MICs comparable to or lower than fluconazole or amphotericin B. Clinical data support validated formulations such as neem oil emulsions (5–10%; 80–90% cure in Tinea), garlic extract capsules (1.3% allicin; systemic candidiasis adjunct), oregano oil nanoemulsions (4–8-fold MIC reduction in resistant strains), curcumin–piperine complexes (synergistic with fluconazole), and polyherbal ointments (neem + turmeric + tea tree; superior to clotrimazole in *Tinea corporis*). We address challenges in standardization, bioavailability, and herb–drug interactions, while emphasizing ethnobotanical guidance in drug discovery. This review underscores the untapped potential of antifungal herbs and formulations in combating resistance and advocates for rigorous clinical trials and pharmacodynamic studies to integrate herbal therapeutics into modern antifungal strategies.

Keywords: Fungal infection, Anti-fungal, Herbs, Herbal formulation, *Allium sativum*

Abstract Id: PCOG-OP- 12a

Integrated Approach to Natural Diuretics and Antioxidants: Insights and Applications

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Abstract

This abstract explores the integrated approach to natural diuretics and antioxidants, emphasizing pharmacological insights and applications in contemporary health practices. Diuretics play a crucial role in managing fluid balance, while antioxidants have gained recognition for their potential in combating oxidative stress. This study synthesizes existing literature regarding the phytochemical profiles of various plants known for their diuretic and antioxidant properties, such as dandelion, green tea, and hibiscus. By analyzing their mechanisms of action at the molecular level, this research highlights synergistic effects that combine diuretic and antioxidant activities, providing a basis for potential therapeutic applications. Furthermore, we discuss the implications for herbal medicine, dietary supplements, and preventive health care strategies, underscoring the significance of integrating pharmacological insights into modern healthcare solutions. The findings advocate for a holistic approach to health that harnesses the benefits of natural products, addressing the need for sustainable and safe alternatives to synthetic medications. The work concludes with recommendations for future research directions that focus on clinical trials and formulations maximally utilizing these natural compounds, ensuring efficacy and safety.

Keyword: Natural Diuretics, Antioxidants, Herbal Medicine, Medicinal Plants, Oxidative Stress, Phytochemicals, Health Benefits.

Abstract Id: PCOG-OP- 12b

Herbal Interventions for High-Altitude Sickness: A Comprehensive Review

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Abstract

Every year, millions of people travel to elevated heights exposing themselves to the risk of experiencing high-altitude sickness. With ascent to high altitude above 1500m, various acute and chronic physiological changes occur in the human body, causing problems such as hypoxia, cerebral oedema, pulmonary oedema, insomnia, frostbite, chilblains, nausea and many more. All these maladies are temporary manifestations, arising due to maladjustment of the human physiology to abrupt altitudinal changes in oxygen, atmospheric pressure, and gravity but can turn fatal and life-threatening. AMS (Acute-mountain sickness) manifests as headache, nausea, dizziness, and fatigue due to hypobaric hypoxia resulting in cerebral vasodilation. HAPE (High-altitude pulmonary oedema) leads to fluid in the pulmonary airway passage due to increased pulmonary vasoconstriction and increased capillary permeability; while HACE (High-altitude cerebral oedema) is characterised by significant oedema due to disruption of the blood brain barrier. To counter these effects many therapeutic herbs like *Withania somnifera*, *Adhathoda vasica*, *Phyllanthus emblica*, *Bacopa monnieri*, *Ocimum sanctum*, *Ophiocordyceps sinensis*, *Commiphora mukul*, *Glycyrrhiza glabra*, *Terminalia arjuna*, and many more. The goal of this review is to consolidate existing knowledge on the pathophysiology, development, and management of high-altitude disorders, with special emphasis on natural interventions that enhance physiological resilience to hypoxia. It further explores how plant-derived compounds can modulate energy metabolism, reduce oxidative load, and stabilize cellular functions, providing a safer and sustainable strategy for altitude adaptation.

Keywords: Acute mountain sickness, High altitude pulmonary oedema, High altitude cerebral oedema, Frostbite, Chilblains.

Abstract Id: PCOG-OP-13

Harnessing Natural Products to Alleviate the Physiological Symptoms of Microgravity

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Abstract

Microgravity is a unique condition of near weightlessness which is encountered by man during spaceflight and affects the basic human physiology as it disrupts the normal gravitational force of human beings. The prolonged exposure to this can lead to various effects like bone demineralization, muscoskeletal deconditioning, cardiovascular alternations, fluid redistribution, immune system impairment, reduced plasma volume and RBC mass . The mechanotransduction pathway of cells becomes disrupted due to reduced mechanical loading that can lead to the changes of the cytoskeletal organization and functions. Some of the conventional countermeasures rely on the exercise regimens and pharmacological support; however these approaches have limitations in safety and long term effectiveness. Herbal medications have gained attention as potential natural counter agents. Adaptogenic herbs such as *Withania somnifera (Ashwagandha) and Moringa oleifera (Drumstick)* may help in bone demineralization, enhance muscle support while anti-inflammatory and anti-oxidant botanicals like *Curcuma longa (Turmeric)* could control oxidative damage and immune dysregulation. Moreover, the medical mushrooms have shown promising effects which are helpful in space missions as they not only serve as nutrition and bioregenerative components as support of life but also act as potential countermeasure against it, e.g. *Ganoderma species* contains immunomodulatory beta glucans and triterpenoids for oxidative stress and immune dysfunction. Even with the availability of preliminary and rigorous data, clinical and space based studies are required to validate efficacy and safety of these herbs.

Keywords: Microgravity, Herbal, *Withania somnifera, Moringa oleifera*, *Curcuma longa*, *Ganoderma*

Abstract Id: PCOG-OP- 14

Herbal Remedies for Stress Relief: Mechanisms and Evidence

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Abstract:

Stress is a physiological and psychological response to any demand or threat against the body that upsets the normal balance (homeostasis) of body functions. More than 75% of the adult population worldwide suffers from stress, which directly contributes to the development of anxiety, depression, insomnia, metabolic diseases, and cardiovascular diseases. Chronic stress results in hyperactivation of the hypothalamic-pituitary-adrenal (HPA) axis and sympathoadrenal system, causing hormonal imbalance, oxidative damage, and neurotransmitter dysfunction. Common medications such as benzodiazepines and selective serotonin reuptake inhibitors (SSRI) may relieve stress in the short term, but they have side effects, tolerance, and withdrawal symptoms after the drug treatment is stopped. Herbal medicines appear to be a safer and more holistic approach to these conditions. Adaptogens such as *Withania somnifera*, *Bacopa monnieri*, *Centella asiatica*, *Rhodiola rosea* and *Panax ginseng* are herbal medicines used to develop body resistance to stress and restore the body to normal balance. Adaptogens enhance the normal functioning of the neuroendocrine system and have the following activities: Modulate HPA (hypothalamic-pituitary-adrenal) axis activities, enhance neurotransmission, decrease oxidative stress and promote neuroprotection. For example, Ashwagandha reduces levels of cortisol and enhances mood, energy and sleep. Thus herbal agents that provide stress relief are a better alternative to conventional therapy since they have multiple targets and few side effects. Future research and standardization of these agents will be beneficial in supporting their therapies.

Keywords: Stress, Adaptogens, hypothalamic-pituitary-adrenal axis, Withania somnifera

Abstract Id: PCOG-OP-15

Formulation and Evaluation of a Herbal Protein Powder Enriched with Prebiotics and Adaptogens for Children Aged 6–12 Year.

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Abstract

Background: Adequate nutrition during the growth years is crucial for the physical and cognitive development of children. Conventional protein supplements often rely on synthetic or animal-derived proteins, which may not align with the increasing preference for plant-based, functional nutrition. Integrating herbal protein sources with prebiotics and adaptogens provides a holistic approach to support growth, digestion, and stress adaptation in children.

Objective: This study aims to formulate and evaluate herbal protein powder fortified with selected prebiotics and adaptogens, designed specifically for children aged 6–12 years, with a focus on its nutritional composition, palatability, and functional benefits.

Methods: A blend of pea protein isolate and mung (Vigna radiata) protein was developed as the primary protein base. Prebiotics such as inulin and fructo-oligosaccharides (FOS) were incorporated to enhance gut microbiota balance. Adaptogenic herbs including Withania somnifera (Ashwagandha) and Ocimum sanctum (Tulsi) were added to promote stress resilience and immune modulation. The formulation was evaluated for proximate composition, solubility, organoleptic properties, microbial safety, and stability. Sensory evaluation was conducted among the target age group using a hedonic scale under ethical supervision.

Results: The optimized formulation exhibited a high protein content (>25%), good solubility, and acceptable sensory characteristics. The inclusion of prebiotics improved digestibility and gut health potential, while adaptogens contributed to enhanced stress tolerance and immune support.

Conclusion: The formulated herbal protein powder offers a safe, natural, and functional nutritional supplement for children aged 6–12 years. The synergy of plant-based proteins, prebiotics, and adaptogens provides a novel approach to supporting growth, gut health, and overall well- being in a pediatric population.

Keywords: pediatric, Children, Herbal, Tulsi, Optimization, Mung

Abstract Id: PCOG-OP- 16

Medicinal benefits of henna for healthy hair

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Abstract

Many people specially our younger generation today are facing a variety of hair problem's and most of them are linked to lifestyle, diet, stress & environmental factor's. Most commonly hair problem's are like: (hair-fall& hair-thinning), (dandruff & dry scalp), (premature graying), (oily scalp & greasy hair), (split end's & hair brakeage). To counter these problem's without using chemical's & preservative's which harm's our hair follicle's if used for long period of time , we shall involve a medicinal plant (Henna) in our life-style. Henna (also known as lawsonia inermis) has been used for centuries as a natural hair treatment along with using henna as a dye it offer's several medicine & therapeutic benefit as well maintaining healthy hair & scalp. Medicinal benefits of henna for healthy hair , (Strengthens hair's & reduce breakage), (Balances scalp oil production) (Promotes scalp health), (Conditions hair naturally), (Improves hair growth), (Natural hair dye). Henna bind's to the keratin in hairs, making it strong & less prone to breakage or split end's regular use of henna can thicken stand's improving overall volume & resilience. Henna has antibacterial,

antifungal, & antimicrobial property that keep's the scalp clean & free from infection's like dandruff's, itchiness, & fungal buildup. Henna balance scalp Ph & reduce excess oil production , mixing henna with growth boosting ingredient's like Amla & fenugreek enhances it's effect. Henna act as natural conditioner by sealing the cuticle's & locking it's moisture.

Keyword : Henna , Keratin , Amla , Fenugreek , Treatment

Abstract Id: PCOG-OP- 17

Phytochemical and Pharmacological Evaluation of Citrullus Colocynthis as potential aphrodisiac activity

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Abstract:
The current study's objectives were to perform an initial phytochemical screening of the seed extracts and assess the aphrodisiac properties of Citrullus colocynthis L. aqueous and thanolic extracts. Citrullus colocynthis L. is a desert viny plant that is native to Asia, particularly Turkey (particularly in areas like İzmir), Nubia, and Trieste. The extract of this plant's seeds to cure sexual issues is very popular. Alkaloids, carbohydrates, flavonoids, and phytosterol were found in the aqueous and ethanolic extracts of Citrullus colocynthis L. seeds that underwent preliminary phytochemical screening. There are no tannins, gums, or mucilages. Experimental rats were used to investigate the phrodisiac properties of the whole extracts. On male wistar albino rats, the ethanolic extract of Citrullus colocynthis L. seeds at a higher concentration (400 mg/kg body weight) demonstrated substantial aphrodisiac action as demonstrated by an increase in the number of mounts, mating performance, hormonal analysis, testes-body ratio, and sperm count. Conversely, aqueous extract (400 mg/kg body weight) and ethanolic extract at a lower dose (200 mg/kg body weight) demonstrated mild aphrodisiac properties. Therefore, the current study's findings indicate that Citrullus colocynthis L. seed extracts have a strong aphrodisiac effect on experimental rats. To determine whether administering the extracts in vivo is helpful for people with sexual dysfunction, further thorough research is required.
Keywords: Citrullus colocynthis seed, Aphrodisiac, erectile dysfunction, flavonoids, phytosterol

Abstract Id: *PCOG-OP- 18*

A Systematic Review on Availability of Essential Medicines Globally

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Abstract:
Objective: Access to essential medicines is a cornerstone of a well-functioning healthcare system and a fundamental component of the right to health. The World Health Organization WHO published its first essential medicines list in 1977 and the first essential medicines list for children was published in 2007. This list was updated every 2 years to maintain the global health priorities, identify the essential drugs which provide more benefits and also for checking the availability and affordability of medicines.
This paper explores the global availability and affordability of essential medicines using the WHO–Health Action International (WHO-HAI) method. It also highlights the differences between public and private healthcare sectors and discusses the key challenges people face in accessing these medicines.
Method: This study is based on literature review and secondary data analysis following PRISMA guidelines. The data is collected from high indexed journals like Google Scholar, Science Direct, Scopus, and PubMed. A total of 14 studies were included and data concerned with availability and affordability using WHO-HAI methodology were extracted.
Result: Global access to essential medicines remains below WHO targets, especially in public sectors of low- and middle-income countries. Private sectors show better availability but often at unaffordable prices. Major barriers

include high costs, supply issues, and frequent stock-outs. Counterfeit and substandard medicines remain a concern. The COVID-19 pandemic exposed major supply chain weaknesses. Urgent policy, investment, and regulatory actions are needed.

Keywords: Essential medicines, Essential medicines list, Availability, Affordability

Abstract Id: *PCOG-OP- 19*

Investigating Herbal extract OF curcuma caesia in diabetes and diabetic retinopathy

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Abstract:
Medical plants are well-known for their bioactive compounds, with various parts possessing distinct medicinal properties such as leaf, rhizomes, stem, seeds. One such medicinal plant is curcuma caesia Roxb, commonly known as black turmeric which is natively found in northern part of india and Nepal. The rhizomes and leaves of this plant have demonstrate antibacterial, antioxidant, anticancer and anti- inflammatory activities that contain phytoconstituents like curcumoids, flavonoids, phenolics and essential oils that help in treatment of chronic metabolic disorder with severe microvascular complications, including diabetic retinopathy a leading cause of vision loss. Curcuma caesia with its unique properties can emerge as a potential alternative to various synthetic drugs used in wound treatment, cancer therapy, bacterial infection and immune system enhancement. In this review we explore the potential applications of curcuma caesia using advanced technique leading to therapeutical use of c.caesia in the field of medicine

Keywords: bioactive compounds, northern part, antioxidant, curcumoids, chronic metabolic disorder, diabetic retinopathy, synthetic drugs, advanced technique.

Abstract Id: PCOG-OP- 20

Hepatoprotective action of Ferulic Acid Analogue: A Comprehensive Review

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Abstract:
In recent times there has been gradual increase in problems related to liver which may be due to various reasons like drinking, medicines overuse etc. therefore it is a major concern need to be taken care of. An herbal compound found in sugarcane named Ferulic acid (FA) is a natural polyphenol, gaining attention for its potent liver-protective and detoxification properties. Ferulic Acid shows antioxidant, anti-inflammatory, and antifibrotic effects, inhibiting pro-inflammatory pathways, and enhancing cellular detoxification enzyme activity in the liver. It protects the liver cells from various toxic substances including drug-induced injury, radiation, and environmental toxins, and prevents liver fibrosis and steatosis by modulating signalling pathways such as TLR4/AMPK. FA also promotes lipid metabolism and insulin sensitivity, further supporting liver health hence protecting from fatty liver. These various pharmacological actions make ferulic acid an excellent candidate for developing safe and effective liver detoxifying formulations. In silico modelling and computer-aided drug design (CADD) can accelerate identification of target interactions and optimization of delivery systems to maximize FA's bioavailability and therapeutic efficacy therefore we designed a molecule i.e. tetrazole an analogue of ferulic acid by substituting carboxylic acid group with tetrazole ring in ferulic acid chain. This modulation provides a foundation to formulate novel liver detox products contributing to improved clinical outcomes in liver health management.

Keywords: Herbal Polyphenol, Hepato protective, Detoxification, Tetrazole analogue of Ferulic acid, Oxidative stress, Fibrosis, Inflammation.

Abstract Id: PCOG-OP- 21

Photoshield Antioxidant Herbal Peel-off Mask

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Abstract:
Generously plant-powered has been one of the most influential factors environmentally-conscious consumers have brought about live plant-based products. To illustrate a point, Photo Shield Antioxidant Herbal Peel-Off Mask is a state-of-the-art device whose main purpose is to supply the skin with oxygen and to stop the skin from oxidative stress and photoaging. This packet bears the power of the four extracts, which are Vetiveria zizanioides, Calendula officinalis, Rubus idaeus, and Camellia sinensis, are the most potent antioxidants, anti-inflammatory, and protective agents that are known to man. Vetiveria zizanioides root extract is the best of the best in the fight against free radicals derived from seriously UV ray-induced oxidation due to the fact that its sesquiterpenes and antioxidants content is quite high, moreover, it also stimulates microcirculation, oil production regulation, and skin firmness. Bioactive antioxidants like flavonoids and triterpenoids of Calendula officinalis are very welcomed in the areas of collagen formation, skin repair, and redness relief, which is caused by antioxidant damage. Rubus idaeus, is an excellent source of ellagic acid, polyphenols, and vitamins A and E. These are the major protective agents against UV rays, and, at the same time, they provide a great support to the skin lipid barrier and hydration. Yet, one of the major reasons that green tea is often singled out is the fact that Camellia sinensis (green tea) leaf contains a very potent antioxidant epigallocatechin gallate (EGCG) which is one of the catechins, and is the most effective free radical scavenger, MMPs inhibitor, and collagen stabilizer. So, it is possible to achieve the goal of lessening the oxidizing attack of reactive oxygen species (ROS), depigmentation and reduction of fine lines, as well as skin firmness enhancement, by using these plant-derived compounds. This preparation is an excellent demonstration of how phytochemistry can be combined with cosmetic innovation and is a forerunner of the present standards of clean, science-based skincare.

Keywords: Herbal peel off mask, Red Raspberry extract, Calendula officinalis, antioxidant, exfoliation, skin rejuvenation, natural skincare, phytocosmetics.

Abstract Id: PCOG-OP- 22

Medicinal benefits of galega officinalis for diabetes

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Abstract:
Diabetes is raising to “alarming epidemic level” globally and has a significant impact on younger population (metabolic disorder) Diabetes is caused by body not producing enough insulin or not using insulin properly which leads to high blood sugar level. When we eat our body breaks down food into glucose, and pancreas is supposed to release insulin from beta cell which are present in (Islet of Langerhans), Insulin then moves the glucose from our blood into cells for energy. Diabetes can be caused by genetics, life-style factor’s, physical inactivity, including obesity, unhealthy diet, other health conditions. Galega officinalis has been used from centuries to treat diabetes, it is also known as ‘goats’ rue’ The rich content of guanidine in galega officinalis has ability of lowering blood glucose level and increase Insulin Sensitivity, hence it is used as a supplementary treatment for type 2 diabetes mellitus, galega officinalis (goat’s rue) has a long history in traditional medicine for treating diabetes symptom & let the discovery & development of metformin. It has been used to lower blood glucose level and protect against diabetes related

complication's by modulating immune cell function & reducing oxidative stress, and inhibiting apoptosis, combining medications with exercise and diet we can control high blood sugar level.

Keywords: Galega officinalis, Insulin, Diabetes, Metformin, Pancreas.

Abstract Id: PCOG-OP- 23

Marine Derived Bioactives in Medicines

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Abstract:
The marine ecosystem represents an immense and largely untapped reservoir of biologically active compounds with significant potential for pharmaceutical development. Marine organisms such as sponges, algae, mollusks, tunicates, and microorganisms thrive in extreme environmental conditions, leading to the production of structurally unique and pharmacologically potent metabolites. These marine-derived bioactives exhibit diverse therapeutic properties, including anticancer, antimicrobial, antiviral, anti-inflammatory, and antioxidant activities, making them valuable leads for novel drug discovery. Over the past few decades, compounds such as cytarabine from sponges, trabectedin from tunicates, and ziconotide from cone snails have successfully transitioned into clinically approved drugs, highlighting the ocean's immense contribution to modern medicine. The extraction and isolation of marine bioactives employ advanced techniques such as solvent extraction, chromatography, and high-resolution spectroscopy, coupled with molecular docking and bioinformatics tools for mechanism elucidation and target prediction. Moreover, biotechnological approaches, including microbial fermentation and genetic engineering, are increasingly being used to overcome challenges in large-scale production and sustainability. Despite their promise, the development of marine-based pharmaceuticals faces limitations such as low yield, complex purification processes, environmental constraints, and ethical considerations in marine resource utilization. In conclusion, marine bioactives hold vast potential to address unmet medical needs and diversify the current therapeutic arsenal. Continued interdisciplinary research integrating marine biology, biotechnology, and pharmacology is essential to unlock the full potential of the marine biome as a sustainable source of future medicines.

Keywords: Marine bioactives, Drug discovery, Marine biotechnology, Natural products, Pharmacology, Marine microorganisms, Therapeutic agents.

Abstract Id: PCOG-OP- 24

Phytochemical Interventions in Non-Alcoholic Fatty Liver Disease: Comprehensive Evaluation of Hepatoprotective Medicinal Herbs

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Abstract:
Non-alcoholic fatty liver disease (NAFLD) is a progressive metabolic disorder characterized by excessive hepatic fat accumulation in the absence of significant alcohol consumption. Affecting nearly one-quarter of the global population, NAFLD is closely associated with obesity, insulin resistance, dyslipidemia, and chronic inflammation. Despite its increasing prevalence, there is currently no approved pharmacological therapy, which has intensified interest in safe and effective alternative treatments. Phytochemicals derived from medicinal herbs have emerged as promising hepatoprotective agents due to their multi-targeted mechanisms of action. Bioactive compounds such as flavonoids, polyphenols, lignans, terpenoids, and alkaloids exhibit antioxidant, anti- inflammatory, hypolipidemic, and insulin-sensitizing properties that directly counteract key pathological processes in NAFLD. Several medicinal herbs—

including Silybum marianum (silymarin), Curcuma longa (curcumin), Camellia sinensis (green tea catechins), Phyllanthus niruri, berberine-containing species (Berberis aristata, Coptis chinensis), and garlic-derived organosulfur compounds—have demonstrated significant efficacy in reducing hepatic steatosis, enhancing mitochondrial fatty acid oxidation, modulating gut–liver axis inflammation, and improving overall metabolic homeostasis. Both preclinical and clinical studies highlight the potential of these phytochemicals to prevent NAFLD progression and attenuate oxidative stress–mediated liver injury. This comprehensive evaluation underscores the therapeutic relevance of medicinal herbs as complementary or adjunct interventions for NAFLD management. Understanding their molecular mechanisms may support the development of integrative hepatoprotective strategies and guide future research toward phytochemical-based drug discovery for metabolic liver diseases.

Keywords: NAFLD, Phytochemicals, Hepatoprotective herbs, Oxidative stress, Lipid metabolism and Natural therapeutics

Abstract Id: PCOG-OP- 25

Nanotechnology Driven Phytopharmaceuticals: An Integrated Approach in Management of Painful Diabetic Neuropathy

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Abstract:
Diabetic neuropathy (DN) is a common and debilitating complication of diabetes, characterized by progressive nerve degeneration and chronic pain. It is a major contributor to foot ulcers, infections, and reduced quality of life, with symptoms predominantly presenting as distal symmetric sensory impairment. Current therapeutic options for DN remain limited, often offering insufficient symptom relief and posing risks of adverse effects. This highlights the urgent need for alternative and more effective treatment strategies. Phytochemicals have shown considerable potential in mitigating neuropathic pain due to their antioxidant, anti-inflammatory, and neuroprotective properties. However, their clinical application is hindered by poor solubility, low stability, and limited bioavailability. Recent advancements in nanotechnology provide promising solutions to overcome these challenges by improving the delivery, targeting efficiency, and therapeutic performance of natural compounds. This review consolidates existing literature on nanotechnology-enabled phytopharmaceuticals for managing painful diabetic neuropathy. Various nanocarrier platforms including liposomes, polymeric nanoparticles, and dendrimers were evaluated for their ability to enhance the pharmacological efficacy of phytoconstituents. Additionally, we discuss current challenges, translational barriers, and future research opportunities within this integrated therapeutic approach. The synergistic combination of phytomedicine and nanotechnology holds significant promise for developing targeted, effective, and safer interventions for diabetic neuropathy, potentially transforming patient care and long-term outcomes.

Keywords: Diabetic neuropathy, bioavailability, phytomedicine and nanotechnology.

Abstract Id: PCOG-OP- 26

Herbal medicine for schizophrenia

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Abstract:
Antipsychotic medication is the mainstay of treatment for people with schizophrenia, and although effective, still leaves some people with distressing symptoms and/or disabling adverse effects. Safer and more effective health care

interventions are needed. Traditional medicine has been used to treat mental health disorders, including schizophrenia, for more than 2000 years. Herbs may also have antipsychotic properties when used in a Western biomedical context. In this study, found trials relevant to the effects of both approaches for schizophrenia. Traditional medicine methodology has been evaluated for schizophrenia, but the one included study was too limited in terms of sample size and study length to guide good practice. However, this pioneering study does show that herbs can be evaluated for its efficacy for people with schizophrenia, and should encourage trialists to undertake further, more comprehensive trials in this area. The use of herbs in a Western medicine context, without incorporating herb methodology, has been evaluated in six trials, although again these are limited by their sample size and study length. The results of these six trials suggest that using herbs alone for psychotic symptoms may not be indicated, but if used in conjunction with Western antipsychotic drugs, they may be beneficial in terms of mental state, global functioning and decrease of adverse effects. However, further trials are needed before the effects of herb for people with schizophrenia can be evaluated with any real confidence.

Keywords: Herbs, schizophrenia, antipsychotic, global, biomedical

Abstract Id: PCOG-OP- 27

ENDOMETRIOSIS: AYURVEDIC PERSPECTIVE AND EVIDENCE-BASED MANAGEMENT

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Abstract:
A chronic gynaecological disorder called endometriosis is characterised by the ectopic growth of endometrial tissue. It can lead to infertility, pelvic pain, dysmenorrhea, and a decreased quality of life. Hormonal therapy, analgesics, and surgery are examples of conventional treatments. While they frequently relieve symptoms, they have drawbacks such side effects and recurrence. According to Ayurveda, endometriosis is a Vata-Kapha dominating condition that involves Rakta and Artava dhatus and manifests as infertility, discomfort, and irregular bleeding. AYUSH Research Portal, PubMed, Scopus, Web of Science, and Google Scholar were used to do a systematic literature review. "Endometriosis," "Ayurveda," "Vata-Kapha disorders," "Panchakarma," "herbal therapy," and "gynaecological pain" were among the keywords. Included were case reports, preclinical research, clinical trials, classical Ayurvedic literature, and systematic reviews that were published between 2000 and 2025. Studies without quantifiable results and non-peer-reviewed publications were included in the exclusion criteria. The information was compiled thematically based on management techniques, pathophysiology, and symptomatology. Uterine tonicity, Rakta purification, and dosha balance are the main goals of Ayurvedic treatment for endometriosis. Panchakarma treatments that target vitiated Vata and get rid of accumulated toxins include Basti (medicated enema) and Virechana (therapeutic purgation). Herbal remedies with anti-inflammatory, analgesic, and hormone-modulatory qualities include Ashokarishta, Dashamoola, Shatavari, and Punarnava. With few side effects, clinical trials show a considerable decrease in monthly abnormalities, pelvic pain, and reproductive results. Ayurvedic treatment of endometriosis provides a supplementary strategy that focusses on reproductive health, dosha balance, and symptom alleviation. By reducing recurrence and improving therapeutic outcomes, evidence-based integration with traditional therapy may support comprehensive reproductive well-being.

Keywords: Ayurveda, endometriosis, gynecology, Panchakarma, herbal therapy

Abstract Id: PCOG-OP- 28

Herbal Interventions for High-Altitude Sickness: A Comprehensive Review

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Abstract:
Every year, millions of people travel to elevated heights exposing themselves to the risk of experiencing high-altitude sickness. With ascent to high altitude above 1500m, various acute and chronic physiological changes occur in the human body, causing problems such as hypoxia, cerebral oedema, pulmonary oedema, insomnia, frostbite, chilblains, nausea and many more. All these maladies are temporary manifestations, arising due to maladjustment of the human physiology to abrupt altitudinal changes in oxygen, atmospheric pressure, and gravity but can turn fatal and life-threatening. AMS (Acute-mountain sickness) manifests as headache, nausea, dizziness, and fatigue due to hypobaric hypoxia resulting in cerebral vasodilation. HAPE (High-altitude pulmonary oedema) leads to fluid in the pulmonary airway passage due to increased pulmonary vasoconstriction and increased capillary permeability; while HACE (High-altitude cerebral oedema) is characterised by significant oedema due to disruption of the blood brain barrier. To counter these effects many therapeutic herbs like Withania somnifera, Adhathoda vasica, Phyllanthus emblica, Bacopa monnieri, Ocimum sanctum, Ophiocordyceps sinensis, Commiphora mukul, Glycyrrhiza glabra, Terminalia arjuna, and many more. The goal of this review is to consolidate existing knowledge on the pathophysiology, development, and management of high-altitude disorders, with special emphasis on natural interventions that enhance physiological resilience to hypoxia. It further explores how plant-derived compounds can modulate energy metabolism, reduce oxidative load, and stabilize cellular functions, providing a safer and sustainable strategy for altitude adaptation.

Keywords: Acute mountain sickness, High altitude pulmonary oedema, High altitude cerebral oedema, Frostbite, Chilblains.

Abstract Id: PCOG-OP- 29

MEDICINAL USES OF ALOE VERA

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Abstract
Aloe vera (aloe barbadensis miller) is a perennial , succulent plant belonging to the family Liliaceae , widely recognized for its remarkable therapeutic ,cosmetic , and pharmaceutical application . it is composed mainly of two major components .the inner gel and the latex . the gel is rich in polysaccharides (mainly acemannan), vitamins (A,C,E,B12), minerals (calcium,magnesium ,zinc) amino acids , and enzymes ,which contribute to its wide range of pharmacological activities such as anti-inflammatory, wound healing , antioxidant, antimicrobial , immunomodulatory , and antidiabetic effects , the latex containing anthraquinones like aloin and emodin , exhibits strong laxative and purgative actions . aloe that is belived to have originated in the sudan . aloe vera grows in arid climates and is widely distributed in africa , india , Nepal and other arid areas. The species is frequently cited as being used in herbal medicine . many scientific studies on the use of extracts of aloe vera have been undertaken , some of them conflicssting. Aloe vera is used for skin irritations like eczema as well as for its internal effects on digestion , such as so thing heartburn and acting as a mild latative .skin irritation and burns .wound healing . moisturizer . digestive health . detoxification of blood sugar .

Keywords: aloe -vera ,Liliacea, vitamins , Antioxidant ,

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Miscellaneous
Poster Presentation

Abstract Id: PCM-PP-01

Machine Learning in Drug Response Prediction: A New Era for PK/PD Modeling and Personalized Medicine

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Abstract

The variability in responses to drugs from different individuals continues to present a major obstacle for optimal therapeutic results. Although pharmacokinetic (PK) and pharmacodynamic (PD) models provide foundational information for drug development and clinical practice, they often fail to account for biological systems' complexities and patient-to-patient variability. Innovative developments in Machine Learning (ML) will offer a new paradigm for PK/PD modeling and include multidimensional data (i.e. genomics, metabolomics, electronic health records, and real-world evidence). We can provide more precise predictions of drug concentration–time profiles, therapeutic windows, and dose–response relationships with available ML methodologies (e.g. deep neural networks, ensemble learning, and reinforcement learning). This capability can advance personalized medicine, as clinicians can develop targeted dosing plans to harness maximum benefit and mitigate harm. In addition, enhancing PK/PD modeling with ML methods will have far-reaching implications for drug discovery, design of clinical trials, and adaptive therapeutic monitoring. However, there remain challenges with data quality, explainability (interpretability), regulatory acceptance, and ethical issues that raise concerns and ensure safe and equitable implementation of ML in healthcare. This review provides the current state of ML in predicting drug response and its transformative potential in characterizing and redefining PK/PD modeling and personalized medicine.

Keywords: Artificial Intelligence, Healthcare, Pharmacokinetics, Pharmacodynamics.

Abstract Id: PCM-PP-02

Smart Drug Delivery: AI-Driven Enhancements in Bioavailability

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Abstract

Artificial intelligence (AI) has emerged as a transformative tool in enhancing bioavailability within drug delivery systems by enabling predictive, adaptive, and optimized therapeutic strategies. Traditional drug development faces challenges such as poor solubility, instability, and variability in pharmacokinetics, which limit effective bioavailability. AI approaches—including machine learning (ML), deep learning (DL), and computational modelling—are increasingly applied to overcome these limitations. By analysing vast datasets, AI can predict drug solubility, permeability, and absorption, thereby facilitating rational design of nano formulations, liposomes, micelles, and polymeric carriers. Furthermore, AI-driven algorithms support optimization of pharmacokinetic profiles through virtual screening, in silico modelling, and physiologically based pharmacokinetic (PBPK) simulations. Recent advances also highlight the role of AI in real-time monitoring of drug release, personalized dosage adjustments, and adaptive drug delivery platforms. Integrating AI with nanotechnology and biotechnology has led to improved precision, reduced toxicity, and enhanced therapeutic outcomes. These innovations provide a framework for patient-

centric and cost-effective drug delivery solutions. Despite challenges related to data quality, interpretability, and regulatory acceptance, AI-based strategies hold immense promise for revolutionizing bioavailability optimization in modern pharmaceutics.

Keywords: Artificial intelligence, machine learning, deep learning, nanotechnology, pharmacokinetics, personalized medicine.

Abstract Id: PCM-PP-03

Artificial Intelligence in Healthcare: Enhancing Efficiency, Accuracy, and Accessibility

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Abstract

The role of Artificial Intelligence (AI) in healthcare continues to reshape our diagnostic capabilities, treatment plans, and ultimately patient care. AI technologies utilize capabilities in machine learning, deep learning, and natural language processing to reveal clinically important patterns in previously untapped datasets. This enables earlier and accurate diagnosis, treatment designed for individuals, and continuous monitoring in pursuit of improved health outcomes. Beyond the clinical space, AI technologies contribute to healthcare efficiencies through predictive analytics, workflow optimization, and patient engagement. Nonetheless, the rapid adoption of AI gives way to serious questions of data security, bias, transparency, and ethical governance. This review outlines a comprehensive summary of how AI technologies are strengthening our link between technological advances and human health and well-being. This article analyzes the contributions of AI to applications in diagnostics, therapeutics, and patient-centered care while exploring the limitations, challenges, and opportunities for the future. This review recognizes AI as a harbinger of the new health ecosystem characterized by improved precision, accessibility, and human-centric care.

Keywords: Artificial Intelligence, Healthcare, Diagnosis, Treatment.

Abstract Id: PCM-PP-04

Artificial Intelligence in Healthcare: Transforming Diagnosis, Treatment, and Patient Care

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Abstract

Artificial Intelligence (AI) is rapidly transforming the healthcare landscape, introducing new and innovative approaches to improving diagnostic accuracy, treatment options, and patient care. AI-enabled systems analyze incredibly large and complex data sets making early disease detection, precision medicine, and predictive analytics, even outside traditional approaches. There are machine learning and deep learning algorithms being applied to diagnostic medicine, such as the medical imaging, pathology, and genomics, presenting clinicians with timely and reliable analytical data. AI's enhanced decision support systems for clinical diagnosis are based on evidence and offering a new way to drug discovery and provide robotic surgery options to improve both efficiency and patient outcomes. AI's greatest impact in patient care will be through virtual health assistants, aerospace remote monitoring, and natural language processing tools that improve several of healthcare's challenges, like patient engagement, reducing disparities to healthcare, and healthcare delivery manipulation. While the emergence of AI in medical diagnostic, clinical decision making, previous borders related to healthcare data privacy and sources remain without solution, neither delving into the complexity of explaining algorithmic results, standardizing information, contextualizing integration of AI into clinical work flows, and ethically governing AI use in clinical applications. What is needed is a comprehensive review reflecting the transformational nature of AI in healthcare generally, but

especially for diagnosis, treatment, and patient care, existing challenges, and future paths to sustainable and equitable application in healthcare.

Keywords: Artificial Intelligence, Healthcare, Diagnosis, Treatment.

Abstract Id: PCM-PP-05

INTERNET OF MEDICAL THINGS (IOMT)

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Abstract

The Internet of Medical Things (IoMT) integrates smart medical devices, wearable's, and sensors to collect and exchange healthcare data through secure communication networks. This ecosystem supports telemedicine, remote diagnostics, and continuous patient monitoring, enabling improved healthcare outcomes and efficiency.

In addition to the potential benefits IoMT may provide, the impact of COVID-19 pandemic has also strengthened the desire to collect patient data remotely and pushed a lot of medical professionals to utilise IoMT applications such as telemedicine, telehealth, remote patient monitoring, remote patient diagnostics and distant consultations etc.

However, increasing interconnectivity introduces cyber security, interoperability, and data privacy challenges that threaten reliability and patient trust. A review of recent healthcare cyber attacks underscores the need for resilient architectures and transparent AI models

In parallel, developing compliant IoMT products requires alignment with FDA regulations (21 CFR Part 820 regulations and upcoming ISO 13485 standards) on device classification, cyber security, quality management, software validation, and post-market monitoring. Integrating regulatory compliance with technological design ensures patient safety and develops trust.

According to survey the Global IoMT market size (Internet of Medical Things [IoMT] 2028).IoMT is about to increase from 93.1 USD Billion to 161.3 USD Billion.

In conclusion IoMT systems emphasize secure-by-design principles, explain ability, and regulatory conformity to achieve sustainable, transparent, and patient-centric healthcare innovation.

Keywords

Internet of Medical Things (IoMT); Cybersecurity; FDA Regulations; ISO 13485; Remote Patient Monitoring; Patient-centric healthcare innovation, Smart medical devices

Abstract Id: PCM-PP-06

Harmonizing Innovation and Regulation: The Role of AI in Pharmaceutical Healthcare

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Abstract

Artificial Intelligence (AI) is transforming pharmaceutical healthcare by accelerating drug discovery, enhancing diagnostics, and improving patient outcomes through predictive analytics and data-driven decision-making. Its applications span personalized medicine, virtual clinical trials, pharmacovigilance, and supply chain management, significantly contributing to efficiency and innovation in the healthcare ecosystem. However, the rapid adoption of AI

brings complex challenges concerning data privacy, algorithmic transparency, regulatory compliance, and ethical accountability. This paper examines the critical balance between innovation and regulation in the context of AI-driven pharmaceutical healthcare. Using a literature review and case study analysis, the study evaluates the ethical, regulatory, and operational implications of AI integration, emphasizing the need for frameworks that foster technological progress while maintaining patient safety and trust. The findings indicate that although AI offers immense potential to reduce costs, accelerate R&D, and promote equitable healthcare access, robust governance, global regulatory harmonization, and interdisciplinary collaboration are vital to mitigate risks. A patient-centric approach and adherence to ethical principles are essential to ensure responsible AI implementation. Harmonizing innovation and regulation will be key to unlocking AI's transformative potential and achieving sustainable, transparent, and equitable healthcare outcomes.

Keywords: Artificial Intelligence, Pharmaceutical Healthcare, Ethics, Regulation, Data Privacy, Innovation, Governance

Abstract Id: PCM-PP-07

DIGITAL THERAPEUTICS (DTx): THE NEW FRONTIER IN REGULATORY OVERSIGHT

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Abstract

Digital Therapeutics (DTx) are clinically validated, software-based interventions designed to prevent, manage, or treat medical conditions. Unlike general wellness apps, DTx products are grounded in scientific evidence, often prescribed by healthcare providers, and subject to rigorous regulatory oversight. They represent a transformative convergence of technology and medicine, pushing the boundaries of traditional healthcare. The evolving regulatory environment for DTx, emphasis the roles of agencies such as the U.S. FDA, European Medicines Agency (EMA), and others. Key milestones include digital health software precertification programs and reclassification of software as a medical device (SaMD). It also addresses critical regulatory issues like evidence standards, lifecycle management, cybersecurity, and healthcare system integration. Additionally, it highlights how regulatory bodies are adapting through agile approval pathways, incorporating real-world evidence, and fostering collaborative industry-regulator partnerships. Case studies of approved DTx products provide practical insights into regulatory pathways and expose current gaps and challenges. Key U.S. FDA regulatory frameworks governing Digital Therapeutics (DTx) and Software as a Medical Device (SaMD) include 21 CFR Part 820 (Quality System Regulation – QSR), 21 CFR Part 807 (Establishment Registration and Device Listing), 21 CFR Part 814 (Premarket Approval – PMA), 21 CFR Part 11 (Electronic Records and Electronic Signatures), and 21 CFR Part 801 (Labeling Requirements for Medical Devices). As DTx continues to blur the boundaries between healthcare and technology, the establishment of flexible yet rigorous regulatory frameworks is imperative. Achieving global harmonization, fostering stakeholder collaboration, and embracing adaptive oversight are key to supporting innovation while protecting patient safety and maintaining public trust.

Keywords: Digital Therapeutics, European Medicines Agency, Digital Therapeutics, Quality System Regulation

Abstract Id: PCM-PP-08

Cybersecurity in medical devices: quality system considerations and content of premarket submissions

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Abstract

The increasing demand for secure cybersecurity in medical devices as connectivity, network-enabled operation, and system-wide interoperate become ubiquitous. It stresses that cybersecurity is a part of device effectiveness and safety, not something distinct. The document pertains to software, firmware or programmable logic containing medical devices and premarket submission routes like 510(k), De Novo, PMA, IDE/HDE, and combinations of these. It sets forth general principles such as design for security, user transparency, and the value of quality system regulation (QSR) encompassed in 21 CFR Part 820. One of its major recommendations is to embrace a Secure Product Development Framework (SPDF) for handling cybersecurity risks throughout the total product lifecycle (TPLC). The advice explains how manufacturers ought to conduct threat modelling, cybersecurity risk assessment (which includes exploitability), third-party software component analysis and interoperability analysis, and deliver a Software Bill of Materials (SBOM). Documentation of these procedures should be proportionate to device risk. In addition, it includes recommendations on labelling and user-visible cybersecurity information, such as management strategies for devices that fall under the new Section 524B of the FD&C Act ("cyber devices"), and device changes and how to deal with them. Appendices include control categories (for example, authentication, cryptography, logging), templates for submission documents, and glossary. Finally, it describes what the FDA expects about showing reasonable assurance of safety and effectiveness through integrated cybersecurity and quality system procedures.

Keywords: Cybersecurity, Cyber devices, Secure Product Development Framework

Abstract Id: PCM-PP-09

REGULATORY CHALLENGES FOR CELL AND GENE THERAPIES

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Abstract

Cell and gene therapies (CGTs) mark a significant change in modern medicine. They offer a chance for cures by tackling the root causes of genetic and acquired diseases, instead of just easing symptoms. Breakthroughs like Zolgensma for spinal muscular atrophy and Luxturna for inherited retinal disorders show their potential to transform clinical practice. However, these developments also bring new regulatory, ethical, and manufacturing challenges. Key issues include ensuring long-term safety and effectiveness through thorough preclinical and clinical testing, maintaining strict Good Manufacturing Practices (GMP) for consistent products, and putting strong post-market surveillance systems in place. Ethical concerns, such as germline modification, informed consent, equitable access, and affordability, add complexity to policy development. Fast advancements in genome editing technologies like CRISPR, base editing, and prime editing are outpacing current regulations, calling for coordinated, adaptable, and clear oversight frameworks across different regions. Regulatory agencies like the FDA, EMA, and CDSCO are creating specific guidelines and faster processes to balance innovation with patient safety. Additionally, new delivery systems, AI-driven design, and non-viral vector methods are changing manufacturing and quality standards. The success of CGTs relies on collaboration worldwide, public trust, and sustainable pricing models to ensure fair access. By promoting flexible yet ethically sound regulations, these therapies can transition from experimental breakthroughs to long-term healthcare solutions that redefine precision medicine and provide lasting hope for future generations.

Keywords: Cell and Gene Therapies (CGTs); Regulatory Challenges; Good Manufacturing Practices (GMP); Post-Market Surveillance

Abstract Id: PCM-PP-10

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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN MEDICAL DEVICE REGULATORY PERSPECTIVES IN USA

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Abstract
Artificial Intelligence (AI) and Machine Learning (ML) are transforming healthcare by enabling software that can learn, adapt, and improve continuously through real-world data. AI/ML-based Software as a Medical Device (SaMD), emphasizes strategies to ensure safety, effectiveness, and transparency throughout the device lifecycle. Building on the FDA's AI/ML-Based SaMD Action Plan (2021), the concept of a risk-based, total product lifecycle (TPLC) regulatory approach is underscored. This framework supports repetitive improvement through a Predetermined Change Control Plan (PCCP)—comprising SaMD Pre-Specifications (SPS) that define "what" can change and an Algorithm Change Protocol (ACP) that explains "how" those changes occur safely and effectively. Continuous real-world performance monitoring, post-market surveillance, and transparent communication with users are critical to maintaining safety and trust as adaptive algorithms evolve. The Action Plan further highlights the importance of Good Machine Learning Practice (GMLP), harmonization of standards, and robust governance to promote responsible innovation. Ensuring data integrity, algorithmic validation, explainability, and ethical oversight is essential to safeguard patients and uphold public confidence. By fostering collaboration among regulators, developers, and stakeholders, this research supports the FDA's vision of a flexible yet accountable oversight model that advances innovation while maintaining a reasonable assurance of safety and effectiveness. Overall, the poster advocates for adaptive regulatory strategies that evolve alongside AI/ML technologies, ensuring their transformative potential in clinical decision-making and patient outcomes is realized safely and responsibly.

Keywords: Artificial Intelligence (AI), Machine Learning (ML), Software as a Medical Device (SaMD), Regulatory Framework and Total Product Lifecycle (TPLC)

Abstract Id: PCM-PP-11

FDA IN ARTIFICIAL INTELLIGENCE MAKING OF DRUG AND BIOLOGICAL PRODUCTS

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Abstract
The guideline "Considerations for the Use of Artificial Intelligence to Support Regulatory Decision-Making for Drug and Biological Products" outlines a structured, transparent approach for evaluating the credibility of AI-based evidence submitted in drug and biologic development. The document applies to AI and machine learning tools used in areas such as clinical trials, product quality assessment, and post-marketing evaluation. It does not apply to AI used purely for administrative, commercial, or non-regulatory functions. The FDA introduces a seven-step risk-based framework to assess AI model, credibility, identifying the regulatory question, defining the context of use, evaluating model risk, planning a credibility assessment, executing and documenting it, and confirming model adequacy. The framework ensures that AI models are reliable, reproducible, and suitable for the decisions they inform. It also highlights the need for ongoing performance monitoring, data integrity, and transparent reporting throughout the AI model's lifecycle. The guidance encourages early communication between sponsors and the FDA to clarify expectations and data requirements when AI-generated evidence is used. While non-binding, the document establishes key principles promoting trust, accountability, and scientific rigor in AI-driven regulatory science, ultimately

supporting innovation while maintaining patient safety and product effectiveness. This guidance marks a significant step in integrating advanced technologies into the regulatory ecosystem. It ensures that AI applications align with ethical standards, data reliability, and transparency. Overall, the framework strengthens confidence in AI-assisted decision-making, promoting scientific progress and safeguarding public health.

Keywords: Artificial Intelligence, Machine Learning, FDA Guidance, Regulatory Science, Drug Development, Biological Products, Risk-Based Framework, Model Validation, Data Integrity.

Abstract Id: PCM-PP-12

EVOLVING REGULATORY LANDSCAPE FOR BIOSIMILARS IN INDIA

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Abstract

Biosimilars, or follow-on biologics, have emerged as vital components in modern therapeutics, offering safe, effective, and affordable alternatives to innovator biologic medicines. India has witnessed remarkable growth in the biosimilar sector, supported by the progressive evolution of its regulatory framework to ensure product quality, safety, and efficacy. The Central Drugs Standard Control Organization (CDSCO) and the Department of Biotechnology (DBT) jointly regulate biosimilars through the Guidelines on Similar Biologics, first introduced in 2012 and revised in 2016 to achieve greater alignment with international standards such as those of the European Medicines Agency (EMA) and the U.S. Food and Drug Administration (FDA). These guidelines adopt a stepwise, evidence-based approach emphasizing analytical characterization, preclinical evaluation, clinical assessment, and post-marketing surveillance. The New Drugs and Clinical Trials (NDCT) Rules, 2019, further streamlined approval pathways, enhanced transparency, and promoted innovation in biosimilar development. Despite these advancements, challenges remain in harmonizing data requirements, maintaining consistent quality standards, and strengthening regulatory oversight. Continued efforts are required to achieve international convergence and ensure global competitiveness.

Keywords: Biosimilars, CDSCO, DBT, NDCT Rules 2019, Regulatory Framework, Similar Biologics, India

Abstract Id: PCM-PP-13

Computational Intelligence in Drug Design: Advances and Opportunities

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Abstract

Modern drug discovery and design have been revolutionized by the advent of computational intelligence (CI), which has brought data-driven, predictive, and extremely effective approaches. Conventional drug development is frequently costly, time-consuming, and subject to high attrition rates. Researchers can evaluate complicated biological and pharmacological information, find molecular patterns, and accurately anticipate drug-target interactions thanks to CI approaches including machine learning, neural networks with artificial intelligence, algorithmic evolution. Artificial intelligence (AI) has emerged as a powerful tool that harnesses anthropomorphic knowledge and provides expedited solutions to complex challenges. Remarkable advancements in AI technology and machine learning present a transformative opportunity in the drug discovery, formulation, and testing of pharmaceutical dosage forms. Computational intelligence makes it easier to optimize lead compounds, predict pharmacokinetic properties, and

evaluate possible toxicity even before synthesis through methods like statistical Structure–Activity Relationship (QSAR) simulation, molecule docking, and pharmacophore mapping. Promising therapeutic candidates can be quickly identified by combining CI with cheminformatics and bioinformatics, which speeds up a virtual test and de novo drug creation. Artificial intelligence methods have recently achieved remarkable advancements in the design of protein sequences and structures, including the ability to generate scaffolds for a given motif and binders for a specific target. These generative methods have been applied to antigen-conditioned antibody design, with experimental binding confirmed for de novo-designed antibodies.

Keywords: Artificial Intelligence, QSAR, computational intelligence, pharmacophore mapping.

Abstract Id: PCM-PP-14

REGULATIONS OF DIGITAL TRANSFORMATION - AI TOOLS FOR PHARM AND MEDICAL DEVICES IN JAPAN

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Abstract

Japanese pharmacy education must undergo a swift, fundamental reform to cultivate technological literacy alongside clinical expertise. The modules of data science, ML fundamentals, and the ethical-legal implications of AI (like algorithmic bias and liability), while providing practical, hands-on training with dispensing robotics and AI-assisted pharmacotherapy software in simulated pharmacy environments. The core regulation is the Act on Securing Quality, Efficacy and Safety of Products Including Pharmaceuticals and Medical Devices (PMD Act), which classifies AI as Software as a Medical Device (SaMD). Key supporting frameworks include the Next-Generation Medical Infrastructure Act (for data use) and the government's AI Business Operator Guidelines (for voluntary compliance). Specific tools include dispensing robots like Yugamba Mini DimeRo® and commercial AI-driven Clinical Decision Support Systems (CDSS) used to predict ADRs and optimize patient pharmacotherapy. These are regulated by the PMDA through mechanisms like the Post-Approval Change Management Protocol (PACMP) to manage their dynamic learning nature. Furthermore, the curriculum must foster interdisciplinary collaboration with data scientists and engineers, ensuring that future pharmacists are not just users, but skilled collaborators and critical evaluators capable of maintaining human oversight and patient safety as they integrate these powerful technologies to optimize individualized drug therapy outcomes.

Keywords: Pharmaceutical and medical device (PMD ACT), commercial AI - driven clinical decision support systems (CDSS)

Abstract Id: PCM-PP-15

Personalized Medicine: "The Future of Tailored Drug Therapies

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Personalized medicine is changing how we understand and treat disease. Instead of using a "one-size-fits-all" approach, it designs treatments that match each person's unique genetics, lifestyle, and health history. Thanks to breakthroughs in genomics, biomarkers, and artificial intelligence, doctors can now predict how someone might

respond to a medication before they even take it. This means fewer side effects, better results, and care that truly fits the individual—not just the average patient. Digital health records and AI-powered tools make this process even smarter. By analyzing health data in real time, they help doctors make faster, more accurate decisions that can significantly improve patient care. We're already seeing real impact—targeted cancer therapies, gene editing, and other precision treatments are saving lives. But there are still challenges: managing massive data, proving effectiveness, and ensuring access for everyone. Moving forward, collaboration will be key. Scientists, doctors, and policymakers must work together to make personalized medicine the standard of care—so every patient gets the right treatment, at the right time. Personalized medicine is changing healthcare for the better, giving people treatments that truly fit them, while teamwork is needed to overcome remaining challenges.

Keywords: Personalized medicine, Precision treatments, Genomics, Biomarkers, Artificial intelligence (AI), Digital health records, Patient care.

Abstract Id: PCM-PP-16

AI-Driven Revolution in Drug Design: Novel Approaches and Future Directions

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Abstract

Artificial Intelligence (AI) has revolutionized pharmaceutical research by overcoming the drawbacks of conventional approaches, which are costly, time-consuming, and prone to failure. Key phases of drug development, such as target selection, lead optimization, de novo drug design, and drug repurposing, have been greatly sped by AI technologies including machine learning (ML), deep learning (DL), and natural language processing (NLP). Resources such as AtomNet for predicting protein structure and AlphaFold for AI's ability to lower costs and improve efficiency is demonstrated via structure-based medication creation.

Precision medicine is made possible by AI-driven platforms that can analyse large chemical spaces, forecast molecular reactions, and optimize clinical trials. Notable instances include Benevolent AI's discovery of baricitinib for COVID-19 therapy and *Insilico* Medicine's AI-designed drug for idiopathic pulmonary fibrosis. Additionally, AI is transforming retrosynthetic analysis and computer-aided synthesis planning, allowing chemists to create synthetic routes with little testing.

Notwithstanding these developments, there are still difficulties, especially with regard to data accessibility, model understanding, ethical concerns, and the integration of various datasets. The success of AI depends on addressing these issues through sophisticated algorithms, standardised data systems, and interdisciplinary cooperation.

All things considered, AI is changing the drug discovery process by shortening development times, increasing success rates, and spurring innovation in the direction of safer, more efficient, and customized treatments. Chemistry is now a data-driven, high-tech area ready to provide revolutionary healthcare solutions because to the continuing AI revolution, resulting in an important change in pharmaceutical research.

Keywords: Artificial Intelligence, Machine Learning, Drug Repurposing, CADD.

Abstract Id: PCM-PP-17

Artificial Intelligence in Pharmaceutical Research: Novel Methods and Success Stories

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Abstract
In pharmaceutical research, artificial intelligence (AI) has become a revolutionary force that speeds up all phases of drug development and discovery. Data evaluation, target selection, lead optimizing, and designing clinical trials have all been transformed by the use of AI technologies, including deep learning, machine learning, and processing of natural language. Researchers can predict drug-target interactions, evaluate large and complicated biological information, and create novel drugs with improved safety and efficacy profiles thanks to AI-driven algorithms. By simulating pharmacokinetic and pharmacodynamic phenomena, machine learning models can lessen reliance on time-consuming and expensive experimental procedures. AI-driven algorithms, including machine learning, deep learning, and natural language processing, enable rapid compound screening, target identification, and de novo drug design with enhanced accuracy and reduced cost. Predictive modeling tools such as QSAR and generative adversarial networks accelerate lead optimization and toxicity prediction. Furthermore, AI supports precision medicine by analyzing complex biological datasets and identifying patient-specific biomarkers.
Success stories include the development of DSP-1181 by Exscientia in collaboration with Sumitomo Dainippon Pharma—the first AI-designed drug to enter clinical trials—and *Insilico* Medicine's AI-discovered fibrosis drug candidate. In the end, AI is a paradigm-shifting catalyst propelling the next phase of intelligent, effective, and customized drug development rather than just a helpful tool.

Keywords: Artificial Intelligence , Deep Learning, Machine Learning, Compound Screening.

Abstract Id: PCM-PP-18

AI in Drug Repurposing: Finding New Uses for Old Drugs

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Abstract
Artificial Intelligence (AI) has emerged as a transformative tool in modern drug discovery, especially in the field of drug repurposing, where existing drugs are identified for new therapeutic uses. Traditional drug development requires years of research and significant financial investment, while AI-driven approaches accelerate this process by analyzing vast biomedical data, chemical structures, gene expression profiles, and clinical trial records. Using machine learning and predictive modeling, AI can uncover hidden drug–disease relationships that might otherwise remain unnoticed. A well-known example is Baricitinib, an anti-arthritis drug identified by AI as an effective treatment for COVID-19, later approved for emergency use. Similarly, Halicin, discovered by AI, was repurposed as a novel antibiotic effective against resistant bacterial strains. These successes demonstrate AI's potential to reduce time, cost, and failure rates in drug development. By integrating computational intelligence with experimental validation, AI is revolutionizing the process of discovering safer, faster, and more efficient therapeutic solutions, marking a major advancement in pharmaceutical innovation.

Keywords: Artificial Intelligence, Drug Repurposing, Machine Learning, Predictive Modeling, Drug Discovery, Pharmaceutical Innovation, COVID-19, Halicin

Abstract Id: PCM-PP-19

Role of Artificial Intelligence in Drug Discovery and Development

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Abstract

Artificial Intelligence (AI) has emerged as a transformative tool in modern drug discovery and development, offering unprecedented efficiency, accuracy, and cost-effectiveness. By integrating machine learning (ML), deep learning, and computational modeling, AI enables rapid identification of potential drug candidates, prediction of target–ligand interactions, and optimization of pharmacokinetic and pharmacodynamic profiles. AI-driven algorithms facilitate virtual screening, de novo drug design, and repurposing of existing drugs through pattern recognition and big data analytics. Prominent AI platforms such as DeepMind's AlphaFold, Atomwise, Insilico Medicine, BenevolentAI, and BioSymetrics are being widely employed for protein structure prediction, molecular docking, lead optimization, and drug–target interaction studies. In preclinical and clinical stages, AI assists in biomarker identification, patient stratification, and adaptive trial design, thereby enhancing success rates and reducing development timelines. Furthermore, integration of AI with omics technologies and real-world data supports precision medicine and rational therapeutic interventions. Overall, AI represents a paradigm shift from traditional trial-and-error approaches toward data-driven, predictive, and personalized drug development strategies, revolutionizing the pharmaceutical research landscape.

Keywords: Artificial intelligence, drug discovery, drug development, machine learning, deep learning, target identification

Abstract Id: PCM-PP-20

Integrating AI into Personalized Medicine for Improved Patient Care

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Abstract

Personalized medicine marks a major shift from the traditional "one-size-fits-all" approach to individualized therapy based on a patient's genetic, molecular, and clinical characteristics. In the pharmaceutical field, Artificial Intelligence (AI) plays a transformative role by enhancing drug discovery, development, and patient-specific treatment design. AI technologies such as machine learning, deep learning, and generative models analyze complex genomic and clinical datasets to identify biomarkers, predict drug responses, and optimize therapeutic outcomes. In research and development, AI accelerates target identification, lead optimization, and clinical trial design by selecting appropriate patient cohorts and predicting adverse drug reactions, thereby improving pharmacovigilance. Generative AI models like Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs) help generate privacy-preserving synthetic patient data, addressing issues of data scarcity and confidentiality. Additionally, AI contributes to dosage optimization, formulation design, and real-time monitoring, ensuring precision and safety in drug therapy. By integrating big data analytics with computational intelligence, AI enhances the efficiency, accuracy, and cost-effectiveness of pharmaceutical processes while promoting innovation in precision medicine. However, challenges such as data privacy, transparency, algorithmic bias, and the need for robust regulatory frameworks must be addressed. The future of AI-driven personalized medicine depends on large-scale validation, interpretability, and human–AI collaboration to ensure ethical, effective, and patient-centered healthcare.

Keywords: Artificial Intelligence, Personalized Medicine, Machine Learning, Deep Learning, Genomics

Abstract Id: PCM-PP-21

Enhancing Patient Adherence: The power of Gamification in Pharma.

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Abstract

Gamification is emerging as an innovative strategy to enhance patient education and improve adherence to medication regimens. By incorporating game design elements— such as points, rewards, challenges, progress tracking, and feedback—into healthcare interventions, gamification makes learning more engaging, interactive, and patient-centred. Mobile health applications and serious games like "MySugr" for diabetes management, "SuperBetter" for mental health resilience, and "Re-Mission" for cancer therapy adherence exemplify how playful elements can transform patient behaviour. These tools promote a deeper understanding of disease conditions, treatment goals, and proper medication use, while motivating patients to follow prescribed regimens. Gamified systems can reduce forgetfulness, enhance self-management skills, and foster positive health behaviours. Additionally, they improve communication between patients and healthcare providers and support long-term behavioural change by stimulating intrinsic motivation. Despite challenges such as age-related usability, digital literacy, and sustaining engagement, gamification holds significant potential to improve therapeutic outcomes and promote better health awareness.

Keywords: Gamification, Medication Adherence, Patient Education, Mobile Health Apps, Behavioural Change

Abstract Id: PCM-PP-22

ARTIFICIAL INTELLIGENCE IN DRUG DEVELOPMENT AND DELIVERY

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Abstract
Artificial intelligence (Al) is set to digitally transform the pharmaceutical, biologic, and wearable device industries . The huge investment of time and money in drug research and development requires the application of more innovative techniques and customized strategies. Al-assisted techniques offer tremendous opportunities for solving the complex algorithms associated with designing of functional drug delivery systems, accelerated drug discovery, identifying potential drug targets and lead drug candidates, predicting the bioactivities and interactions of drugs and treatment outcomes . For health care, big datasets and complex algorithms will integrate the development and delivery of small- and large-molecule drugs, genetic therapies, and medical devices tailored to specific user profiles and even to individual consumers, with dynamic, real-time updates and adjustments . The machine learning(ML) and disruptive management have taken over the world by storm and are now becoming a part of digital health sciences. By narrowing down the application of Al research and challenges, it is possible to bring translational benefits. Herein, the major Al applications in healthcare, particularly concerning drug discovery, development and delivery, include advanced in artificial neural networks to enhance both speed and efficiency of drug discovery; organ-ona-chip as next-generation microfluidic networks to improve drug development; 3D Bioprinting of biological models toward amplified and more reproducible in vitro drug testing; complex gene-drug interactions studied by pharmacogenomics wearable devices revolutionizing drug administration methods and enabling increased compliance and easier drug delivery quality-by-design methodology ensuring optimization of drug quality and manufacture processes.

Keywords: Artificial Intelligence, Machine Learning, Drug Discovery, Pharmacogenomics, 3D Bioprinting, Organ-on-a-Chip, Quality-by-Design, Precision Medicine.

Abstract Id: PCM-PP-23

INDIAN PERSPECTIVES ON PHARMACOVIGILANCE, COSMETOVIGILANCE, HEMOVIGILANCE, AND MATERIOVIGILANCE

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Abstract:

Protecting public health depends on continuous monitoring of products used in healthcare and daily life. This study compares four key surveillance systems Pharmacovigilance, Hemovigilance, Cosmetovigilance, and Materiovigilance each ensuring the safety and quality of medicines, blood products, cosmetics, and medical devices. Pharmacovigilance (PvPI) tracks drug safety, detects side effects, and reduces risks through collaboration among healthcare professionals, regulators, and industry. Materiovigilance (MvPI), managed by SCTIMST, oversees medical device safety; Hemovigilance (HvPI), coordinated by NIB, monitors transfusion-related reactions; and Cosmetovigilance (CvPI), under IPC and CDSCO through the Cosmetic Rules 2020, ensures cosmetic product safety.Serious and unexpected adverse reactions must be reported within 14–15 days, and reporting can be done by health professionals, manufacturers, or consumers. Unsafe products are recalled under CDSCO supervision, classified as Class I–III based on risk level. India uses VigiFlow for drugs and maintains national databases for devices, blood, and cosmetics under CDSCO and IPC. Despite challenges, all four vigilance programs are vital for preventing harm and promoting safer healthcare practices. Strengthening integration among these systems can improve early detection, timely action, and coordinated global safety monitoring ultimately protecting the health and well-being of patients and consumers worldwide.

Keywords: Pharmacovigilance, Materiovigilance, Hemovigilance, Cosmetovigilance; Adverse drug reaction, CDSCO, Public health; Patient safety.

Abstract Id: PCM-PP-24

Artificial intelligence: the future of drug design

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Abstract

Artificial Intelligence (AI) is rapidly changing the way new medicines are discovered and developed. By combining computational power with large biological and chemical datasets, AI helps researchers identify promising drug candidates faster and more accurately than traditional methods. In this study, different AI models—including Support Vector Machines (SVM), Random Forest (RF), Deep Neural Networks (DNN), Generative Adversarial Networks (GANs), and Reinforcement Learning (RL)—were applied to predict drug-likeness, design new molecular structures, and estimate their binding potential. Data for model training and testing were collected from open-access databases such as PubChem, ChEMBL, and DrugBank. The trained models showed strong predictive performance, achieving around 92% accuracy in identifying active compounds—significantly higher than classical QSAR techniques. AI-based molecule generation also produced compounds that met Lipinski's Rule of Five, indicating good drug-like properties. Further validation through molecular docking and molecular dynamics simulations revealed stable binding energies (−8.5 to −10.2 kcal/mol), confirming their potential biological activity. Overall, the study highlights how AI can make drug design faster, more cost-effective, and more efficient by helping scientists explore chemical spaces that were once difficult to reach.

Keywords: Artificial Intelligence, transparency, discovery, validation, Machines

Abstract Id: PCM-PP-25

Artificial Intelligence in Early Detection and Management of Foetal Diseases

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Abstract

The integration of artificial intelligence (AI) in modern healthcare has brought remarkable progress in the early detection and management of foetal diseases. Conditions such as congenital heart defects, neural tube abnormalities, and chromosomal disorders often go unnoticed during early pregnancy due to diagnostic limitations. AI offers innovative solutions by analysing complex prenatal data, including ultrasound images, genetic sequences, and biochemical markers, to identify subtle signs of abnormal foetal development. Machine learning algorithms enable computers to recognize intricate patterns and provide predictive insights that assist healthcare professionals in diagnosing potential complications at an early stage. This approach enhances accuracy, reduces human error, and allows for timely medical intervention, thereby improving survival rates and long-term outcomes. Additionally, AI-based imaging systems have shown great potential in improving prenatal screening precision and supporting clinicians in critical decision-making. However, challenges such as data privacy, ethical concerns, and the need for clinical validation must be addressed before large-scale implementation. Collaboration among clinicians, engineers, and data scientists remains crucial to ensure safety and reliability. In conclusion, AI stands as a transformative tool in prenatal medicine, enabling early diagnosis, targeted treatment, and improved maternal–foetal care. Its responsible and ethical use holds immense promise for shaping the future of foetal health management.

Keywords: Artificial Intelligence, Foetal, Diseases, Treatment, Machine learning

Abstract Id: PCM-PP-26

Intergration of 3D Bioprinting and Organ-on-a-chip Technology for Cardiac Function Modeling

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Abstract

The bioprinted organ-on-a-chip is an emerging technology that integrates 3D bio printing with microfluiding organ-on-chip platform to closely mimic human organ physiology in vitro. These systems combine bioprinted tissues with microchannels that simulate blood flow and nutrient exchange, offering a dynamic and physiologically relevant environment. Through 3D bioprinting, multiple cell types and biomaterials can be precisely arranged layer by layer, allowing the creation of complex, functional tissue architectures.

Recent advances in 3D bioprinting and organ-on-a-chip technology have enabled the creation of mini heart tissues that replicate natural structure and beating function. Using human stem cell–derived cardiomyocytes, researchers can bioprint aligned muscle fibers that contract rhythmically under microfluidic flow. A 2024 study from the University of Galway developed shape-morphing heart-tube constructs with enhanced contractile strength, while scientists at Harvard's Wyss Institute created the first fully 3D-printed heart-on-a-chip with built-in strain sensors to measure real-time contractions. These systems accurately model heart formation, electrical activity, and drug responses—offering powerful tools for cardiac research and reducing reliance on animal testing

By integrating 3D bioprinting precision with organ-on-chip functionality, this hybrid platform creates realistic in vitro organ model that better represent human physiology. Such systems hold immense promise for drug discovery, toxicology screening, and personalised medicine, reducing the reliance on animal testing and improving the prediction of human responses. The bioprinted organ-on-a-chip thus marks a transformative advancement in biomedical research and pharmaceutical innovation.

Keywords: Cardiac function modeling, microfluidics, 3D bioprinting, Heart-on-a-chip,Drug discovery, In vitro organ models.

Abstract Id: PCM-PP-27

Artificial Intelligence Boosts Pharmacovigilance

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Abstract

Pharmacovigilance-the branch of science concerned with detecting, assessing, preventing, and managing adverse drug reactions has undergone a radical transformation with the integration of AI. Traditional pharmacovigilance methods rely significantly on manual reporting and spontaneous submissions that, they may delay even signal detection; often, they also have data quality issues. AI technologies include machine learning, natural language processing, and data mining, have emerged as powerful tools to address these constraints by automating very complex processes and improving the efficacy of drug safety monitoring.

Such systems use the processing power and activeness of large data heterogeneous sources, to streamline signal detection and monitoring. Technologies are able to render visible security signals not only for spotting signs of possible adverse events, enabling a proactive approach in risk management strategies. Machine learning algorithms can handle thousands of reports each month for adverse events; thus, the time spent doing manual work will be greatly reduced for experts in pharmacovigilance while also improving the accuracy of the data through the elimination of duplicates and through automated processing of cases.

Even so, the real application of AI for pharmacovigilance remains, and very much so, in academia. Phases of implementation for AI have encountered problems of data quality, regulatory barriers, and the demand for transparent algorithms. Indeed, with the changing tide in the pharmaceutical domain, AI promises to enhance drug safety monitoring, improve the early detection of adverse events, and the eventual improvement of patients' and the public's health security by AI-powered pharmacovigilance systems.

Keywords: Pharmacovigilance; Artificial Intelligence; Machine Learning; Adverse Drug Reactions; Drug Safety Monitoring.

Abstract Id: PCM-PP-28

Herbavigilance: Current Challenges, Emerging Strategies, and Future Perspectives

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Abstract

Nearly 80% of individuals widely depend on herbal products as their first-line therapy; however, the ability to monitor these medications is still inadequate. Herbavigilance, the active supervision of herbal and traditional medicines, is necessary to identify and interrupt adverse reactions and problems with herbal medications.

The variety of bioactive compounds in herbal products and their variability make it uncertain which compounds are attributable to negative reactions. Some of the significant issues are under-regulation or regulation noncompliance, contamination with toxic agents, environmental pollution, botanical mix-ups, and poor reporting of adverse events.

Moreover, because herbs can interact dangerously with medications, through metabolic enzymes and proteins, response times may be depended when people take multiple drugs. Reaction reporting systems currently use voluntary reporting, post-marketing surveillance systems, and active monitoring programs to gather data. Reporting rates can vary because of the voluntary nature of reporting for adverse drug reactions to herbal products.

Evaluations from different countries demonstrate serious issues such as a lack of professional competency of health workers, and resources for monitoring adverse reactions to herbal products. It is and will always be essential to provide assurance about the safety and efficacy of herbal medicines in healthcare, in order to conduct efficacy, or

herbavigilance. The World Health Organization, AYUSH provides guidelines which are encouraging to use modern techniques

Keywords: Herbavigilance, Herbal Medicines, Pharmacovigilance, Adverse Reactions, Quality Control.

Abstract Id: PCM-PP-29

Artificial Intelligence in Personalized Drug Delivery Systems

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Abstract

Personalized drug delivery systems (DDS) have emerged as a transformative approach in enhancing efficacy and minimizing the side effects of therapeutic treatments. These systems are designed to deliver drugs in a controlled manner, ensuring that the active pharmaceutical ingredients reach the targeted site at optimal concentrations, and only when required. The integration of artificial intelligence (AI) into the design of DDS is a promising frontier that enhances precision, personalizes treatment, and accelerates drug development. AI techniques, particularly machine learning, are being leveraged to predict drug behavior, design nanoparticles, optimize formulations, and simulate biological interactions. AI algorithms analyze large datasets from preclinical and clinical studies, as well as molecular interactions, to create predictive models that guide the customization of drug delivery. This personalized approach is crucial for addressing patient-specific factors, such as genetic variations, disease stages, and environmental influences, which affect drug response. Furthermore, AI aids in the development of smart DDS capable of responding to environmental triggers, such as pH or temperature changes, which can release drugs in a controlled and targeted manner. By merging AI with advanced biomaterials and nanotechnology, nextgeneration DDS are becoming more efficient, adaptable, and safer for individual patients. As AI continues to evolve, its role in revolutionizing Personalized drug delivery systems holds significant potential in improving patient outcomes and transforming the landscape of modern therapeutics.

Keywords: Personalized Drug Delivery, Artificial Intelligence, Machine Learning, Personalized Medicine.

Abstract Id: PCM-PP-30

A REVIEW ON PHARMACEUTICAL SCIENCE: BIOSTATISTICAL METHODS

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A pharmaceutical science researcher may often ask, “Why are statistical methods so important in research?” The simple answer is that statistical techniques are essential at every stag8e of a study — from planning and designing to data collection, analysis, interpretation, and reporting. Therefore, it is crucial for researchers to understand at least the basic statistical concepts applied throughout the research process. This knowledge enables them to design well-structured studies that produce valid, reliable, and generalizable results. A properly designed study minimizes bias and yields precise and trustworthy findings.

Various statistical methods and tests are applied at different phases of research. In this paper, we highlight the overall significance of statistical considerations in pharmaceutical research, focusing particularly on the estimation of minimum sample size for diverse study objectives. It is recommended that biostatistics education be strengthened for students of pharmaceutical sciences and related disciplines, both at undergraduate and postgraduate levels. Moreover,

researchers should seek guidance from biostatisticians during the study design phase. Any manuscript employing statistical analysis, even at a basic level, should be reviewed by a qualified biostatistician. Finally, wherever feasible, editorial boards of medical journals should include a biostatistician as an associate editor.

Keywords: Statistics, research, sampling, study designs

Abstract Id: PCM-PP-31

3D Printing: Shaping the Future of Personalized Drug Delivery

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Abstract:
The advancement of 3D printing technology is transforming personalized drug delivery by facilitating the accurate production of tailored medications to meet the specific needs of individual patients. This groundbreaking method enables the development of intricate drug dosage forms featuring controlled-release mechanisms, multiple-drug combinations, and dosage adjustments that reflect individual genetic, physiological, and disease-related factors. Using methods such as fused deposition modeling and inkjet printing, 3D printing allows for manufacturing on demand, which minimizes waste and provides a quick response to the specific therapeutic needs of patients. This technology improves drug effectiveness, promotes patient adherence, and enhances safety while overcoming the constraints associated with traditional mass-produced pharmaceuticals. Although there are challenges like material compatibility and regulatory requirements, 3D printing has significant potential to revolutionize pharmaceutical manufacturing and lead us into a new era focused on patient-centered care.

Abstract Id: PCM-PP-32

The Rise of Artificial Intelligence in the Pharmaceutical Field.

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Abstract
The integration of Artificial Intelligence (AI) in the pharmaceutical industry has profoundly transformed traditional drug discovery and development processes, ushering in a new era of efficiency, accuracy, and innovation. Historically, drug discovery has been characterized by its labor-intensive nature, high costs, lengthy timelines, and significant failure rates, with clinical trials in oncology, for instance, seeing failure rates as high as 97%. AI, leveraging machine learning (ML), deep learning (DL), and advanced data analytics, addresses these challenges by streamlining various stages of the pharmaceutical pipeline, from initial target identification to post-market surveillance. This technological shift is revolutionizing the pharmaceutical landscape by accelerating the identification of novel drug candidates, optimizing clinical trial designs, and enabling personalized therapies. Despite the transformative potential, the widespread adoption of AI in pharmaceuticals faces several challenges, so it should not be trusted blindly. Many companies are now focusing on integrating and expanding AI application within the pharmaceutical fild to achieve greater innovation and efficiency. Regulatory frameworks struggle to keep pace with AI's rapid advancements, creating gaps and complexities. There is a lack of harmonization in classifying combined medicinal products and medical devices, particularly in regions like the European Union, which can hinder development.

Keywords: Regulatory, Artificial Intelligence, technological shift, accuracy, machine learning

Abstract Id: PCM-PP-33

CTD and ACTD Formats: A Common Language for Drug Registration

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Abstract
The Common Technical Document (CTD) and ASEAN Common Technical Dossier (ACTD) are standardized formats developed to harmonize drug registration processes across different regulatory authorities. The CTD, introduced by the International Council for Harmonisation (ICH), and the ACTD, adopted by the ASEAN member states, streamline submission requirements, minimize duplication of data, and facilitate faster review and approval of new drugs. These formats play a crucial role in ensuring the quality, safety, and efficacy of pharmaceuticals while promoting global access to lifesaving therapies. By providing a common structure for technical information, CTD and ACTD strengthen regulatory cooperation and accelerate the availability of essential medicines worldwide.

Keywords: **Common Language,** harmonize drug, promoting global, efficacy, regulatory authorities

Abstract Id: PCM-PP-34

ARTIFICIAL INTELLIGENCE POWERED IN CLINICAL TRIALS

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Abstract:
Artificial Intelligence (Al) is transforming the way we conduct clinical trials, making them more efficient, accurate, and patient-centered. This poster explores the many ways Al is being used in clinical trials, from identifying and enrolling participants to analyzing data and predicting outcomes. We'll show how Al-powered tools, like machine learning and natural language processing, can help design better trials, make them run smoother, and give us more reliable results. We'll also highlight the benefits of using Al in clinical trials, including saving time and money, and getting better quality data. Plus, we'll discuss some of the challenges of using Al in clinical trials, like navigating regulations, making sure data is consistent, and avoiding biases in Al algorithms. The future of clinical trial is changing rapidly due to the introduction of artificial intelligence to study the clinically significant patterns and algorithms generated upon the impact from the trial. The technique of artificial intelligence allow the decision makers to study the clinical trials in real life conclusion which increases the accuracy of the trial. Thus, decreasing the burden of the pharmaceutical industry and increasing the success rates of the trials. Moreover, clinical trial is a much time consuming process involving 1 0 to 1 5 years for just one drug molecule with lot of investment. With the use of the Al powered clinical trial one drug from every hundred drugs pauses this phase easily with genuine results which is much greater than the conventional procedure.

Keywords :- Clinical trials, Articficial Intelligence, Machine Learning, Drug development Cycle , Time investment and Data analysis.

Abstract Id: PCM-PP-35

Neuro-Pharma AI: Brain-Inspired Intelligence for Next-Generation Drug Discovery

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Abstract
The integration of neuroscience and artificial intelligence (AI) is giving rise to a new interdisciplinary research field known as Neuro-Pharma AI. Traditional AI systems in drug discovery often rely on static datasets and linear algorithms that lack the adaptability and dynamic learning capacity of the human brain. Neuro-Pharma AI introduces brain-inspired computational architectures, including spiking neural networks and synaptic learning algorithms, to replicate how neurons communicate, adapt, and store molecular information. By mimicking these biological learning processes, AI platforms can analyze complex chemical structures, predict drug–target interactions, and identify novel therapeutic compounds with exceptional precision and speed.This approach not only accelerates the drug discovery pipeline, but also enhances personalized pharmacotherapy, reduces research cost, and minimizes experimental error. The convergence of neuroscience, pharmacy, and artificial intelligence represents a paradigm shift — moving from machines that calculate to machines that think like scientists, redefining the future of pharmaceutical innovation.

Keywords: Neuroscience · Artificial intelligence · Drug discovery · Spiking neural networks · Personalized pharmacotherapy

Abstract Id: PCM-PP-36

From Molecule to Market: The Journey of a Drug Through Regulatory Hurdles

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Abstract:
Turning a new molecule into a medicine people can actually use is anything butsimple. It's a long process with lot of guidelines, careful checks, and a lot of eyes making sure nothing slips through the cracks. From the first spark of discovery in the lab all the way to human trials and finally getting that stamp of approval, every part is tightly controlled by strict scientific and legal standards. Big regulatory agencies like the Central Drugs Standard Control Organization (CDSCO), USFDA, and EMA don't miss a thing. They go over every step of drug development, making sure new medicines are safe, effective, and up to quality standards. They dig through the data from early lab tests and those all-important clinical trials before giving any kind of green light. Companies have to follow guidelines from the International Council for Harmonization (ICH) too, which keeps everyone playing by the same guidelines around the world. But the work doesn't stop once a drug hits the shelves. There's a whole system called post-marketing surveillance that keeps an eye out for any long-term safety issues and steps in fast if something pops up. This paper lays out the main steps of drug development and shows how health authorities stay involved to protect the public every step of the way.

Keywords: **Drug, Regulatory,** Central Drugs, clinical trials, authoritie

Abstract Id: PCM-PP-37

AI-Powered Pharmacovigilance and Post-Marketing Surveillance: Advancing Drug Safety through Intelligent Automation

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Abstract:
The rapid advancement of Artificial Intelligence (AI) is transforming traditional pharmacovigilance and post-marketing surveillance (PMS) systems by enhancing the detection, assessment, and prevention of adverse drug reactions (ADRs). Conventional pharmacovigilance methods often rely on manual data entry and delayed reporting, leading to inefficiencies and underreporting. AI-powered systems, utilizing machine learning (ML), natural language

processing (NLP), and big data analytics, can automatically analyze vast volumes of real-world data from diverse sources such as electronic health records, social media, and spontaneous reporting systems. These technologies facilitate early signal detection, improve accuracy in adverse event classification, and support regulatory decision-making with predictive insights. Furthermore, AI models enable continuous monitoring of product safety, ensuring rapid identification of emerging risks even after market approval. Integrating AI into pharmacovigilance not only reduces human error but also fosters proactive and data-driven drug safety management, aligning with global regulatory expectations. This paper highlights the applications, benefits, and ethical challenges of AI in strengthening pharmacovigilance and post-marketing surveillance frameworks for improved patient safety and public health outcomes.

Keywords: Artificial Intelligence, Pharmacovigilance, Post-Marketing Surveillance, Adverse Drug Reactions, Machine Learning, Drug Safety.

Abstract Id: PCM-PP-38

NOVEL DRUG APPROACH: 3D PRINTING PERSONALIZED DRUG DELIVERY ADDITIVE MANUFACTURING

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Abstract

The emergence of 3D-printed personalized drug delivery has transformed modern pharmaceutical technology. Additive manufacturing allows medicines to be designed patient- specific, based on dose, age, disease condition, and pharmacokinetic needs. Using techniques like Fused Deposition Modeling (FDM), Selective Laser Sintering (SLS), and Inkjet Printing, drugs can be printed in customized shapes, sizes, and release patterns. This approach improves drug bioavailability, enhances treatment adherence, and reduces side effects by delivering the exact dose required for an individual. In 2025, 3D printing is also being explored for multi-drug polypills, complex controlled-release systems, and on-demand manufacturing in hospitals. Overall, 3D-printed personalized medicine represents a major step forward in precision therapeutics, providing safer, faster, and more effective drug therapy.

Keywords: 3D printing, Personalized drug delivery, Additive manufacturing, Controlled release, FDM, SLS, Inkjet printing, Precision medicine.

Abstract Id: PCM-PP-39

Monoclonal Antibody-Mediated Targeted Drug Delivery in Non-Small Cell Lung Cancer: Current Trends and Future Prospects

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Abstract

Non-small cell lung cancer (NSCLC) is one of the most prevalent and lethal types of cancer globally with limited therapeutic options. Conventional treatments, including chemotherapy, radiotherapy and surgery, frequently harm healthy cells and do not always work effectively as cancer can either adapt or develop resistance. Monoclonal antibodies (mAbs) offer a more focused approach. They can recognize certain molecules that are on a cancer cell and then stop them from growing or help the immune system attack them. In recent years scientists have attempted to link such antibodies with various types of nanoparticles, including liposomes, polymeric and lipid-based carriers

and even gold and silica particles. The theory is that the nanoparticles can be used to deliver the drugs safely across a body, and then the antibodies guide them directly to the tumor site. These approaches can protect the drug from degradation, enable controlled release and minimize the undesirable side effects. There are still some hurdles, including heterogeneity among tumors, immune system clearance and the difficulty of producing these complex systems consistently. Researchers are now turning to dual-targeting antibodies, biomarker-based patient selection and even delivering them directly into the lungs. Overall, antibody-guided nanoparticles could make NSCLC treatment strategies more targeted, effective and safer for patients.

Keywords: Non-small cell lung cancer, monoclonal antibodies, nanocarriers, targeted therapy, personalized medicine.

Abstract Id: PCM-PP-40

AI IN PHARMACEUTICAL RESEARCH AND INNOVATION

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Abstract

Artificial Intelligence (AI) has emerged as a transformative force in the pharmaceutical industry, significantly enhancing drug discovery and development processes This review addresses the incorporation of AI technologies, consisting of machine learning (ML) and deep learning (DL) methods, throughout multiple phases of drug development, right through processed phases of drug development of clinical trial design. The pharmaceutical industry faces challenges, including high research and development (R&D) costs and low new drug approval rates, which require innovation. AI has the capacity to expedite and compact these processes as ML can be executed for analyzing big data, predicting drug efficacy/safety and optimizing clinical trial recruitment efficiencies. This review identifies the advancements of novel AI applications to identify drug candidates (existing drugs and novel from scratch) interactively accelerated and enhance efficiency R&D. Furthermore, the integration into drug development and R&D - pharmaceutical companies verses AI companies provide for advanced computational tools and opportunities to impact health care. Not forget we have made advancement, challenges still remain to address include quality of data, scarcity of human resource capital, and AI will create job displacements.. The future of AI for drug development is in the growth stage and is anticipated to entail lower costs and better success rates bringing new therapeutics to market, and will finally transform the pharmaceutical research and development space.

Keywords: Artificial Intelligence (AI), Drug Discovery, Drug Development, Machine Learning (ML), Deep Learning (DL), Pharmaceutical Industry.

Abstract Id: PCM-PP-41

Harnessing Artificial Intelligence in Drug Design for Alzheimer's Disease: Accelerating the Journey from Molecule to Medicine

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Abstract:

Alzheimer's disease (AD) remains one of the most formidable neurodegenerative disorders, marked by progressive cognitive decline, β-amyloid plaque accumulation, tau protein aggregation, and synaptic dysfunction. Despite extensive research efforts, effective disease-modifying treatments are still scarce. The advent of Artificial Intelligence (AI) is revolutionizing drug discovery for AD by expediting the identification, optimization, and validation of novel molecular entities and therapeutic targets. AI-driven approaches employing machine learning (ML), deep learning architectures, and molecular simulations enable accurate prediction of drug target interactions, optimization of lead

compounds for blood–brain barrier permeability, and reduction of off-target toxicity. Moreover, AI-powered virtual screening of large chemical and natural product libraries has accelerated the discovery of β-secretase (BACE1) and tau aggregation inhibitors. The integration of multi-omics datasets encompassing genomics, proteomics, and metabolomics through AI algorithms facilitates the identification of early diagnostic biomarkers and supports precision medicine strategies. In silico modelling of pharmacokinetic and pharmacodynamic properties further minimizes attrition rates during preclinical and clinical development. The convergence of AI with neuroinformatics, molecular docking, and generative chemistry heralds a paradigm shift toward more efficient, cost-effective, and rational drug design for AD. Collectively, AI emerges as a transformative force bridging fundamental molecular insights and clinical translation, effectively accelerating the path from molecule to medicine in the global effort to combat Alzheimer's disease.

Keywords: Artificial Intelligence, Alzheimer's Disease, Drug Design, BACE1 Inhibitors, Tau Aggregation, Biomarker Discovery, In Silico Modeling.

Abstract Id: PCM/PP/42

Role of Regulatory Affairs in Early Drug Development

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Abstract

The initial phase of drug development, which includes preclinical research and Phase I clinical trials, plays a vital role in determining the safety and potential effectiveness of new drug candidates. During this stage, Regulatory Affairs (RA) professionals are essential in ensuring that scientific advancements comply with international regulatory requirements and ethical guidelines. They supervise preclinical studies conducted under Good Laboratory Practice (GLP) to ensure that the data produced is credible and suitable for initiating human trials. RA experts are also responsible for organizing and submitting essential regulatory documents, including the Investigational New Drug (IND) Application, Investigator's Brochure (IB), and Clinical Trial Protocols. In addition, they maintain continuous communication with major authorities such as the USFDA, EMA, and CDSCO. Their proactive approach to dossier preparation, regulatory planning, and risk management helps optimize timelines and prevent unnecessary delays in drug approval. In essence, Regulatory Affairs acts as a vital link between research and regulation, ensuring that the transition of a new molecule from the laboratory to human testing is carried out safely, efficiently, and in full compliance with global standards of quality and transparency.

Keywords: Regulatory Affairs, Good Laboratory Practice USFDA, EMA, and CDSCO

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Miscellaneous
Oral Presentation

Abstract Id: PCM-OP-01
Transitional Research Application of New Molecules for Patient's Care

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Abstract
Translational research is a vital interdisciplinary approach that connects basic scientific discoveries with clinical application, expediting the development and evaluation of new molecules for patient care. By integrating molecular biology, bioinformatics, and clinical trials, translational research facilitates personalized medicine through biomarkers and targeted therapies. This process reduces the gap between laboratory findings and clinical treatments, aiming to improve therapeutic efficacy and patient outcomes. Despite challenges like maintaining product consistency and scalability, translational research fosters collaboration among researchers, clinicians, and industry stakeholders to accelerate the delivery of innovative therapies from bench to bedside.

Keywords: Personalized medicine, drug development, molecular biology, advanced therapies.

Abstract Id: PCM-OP-02
Artificial Intelligence in Modern Drug Development: From Molecule Design to Lifesaving Therapies

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Abstract
The pharmaceutical industry confronts major problems, with clinical success rates falling below 10% and drug research requiring 10 to 15 years at a high cost. Artificial intelligence (AI) is transforming this process, improving everything from molecular design to drug delivery. AI employs Machine Learning (ML) and Deep Learning (DL) techniques to scrutinise biomedical research datasets, identifying intricate patterns and bridging the divide between empirical methods and logical, predictive design.

The systematic mapping of biological pathways with AI knowledge graphs and multi-omics integration improves target discovery and validation, resulting in greater prioritisation and confidence in choosing novel druggable targets. Generative algorithms such as Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs) are used in the analysis to build molecular entities and optimise leads.

These models enhance pharmacodynamic and physicochemical properties, thereby diminishing the need for complex chemical production and traditional high-throughput screening. Predictive machine learning methods, such as DeepTox and Graph Neural Networks (GNN), help with ADMET profiling, lowering attrition rates in preclinical studies and detecting liabilities earlier. Furthermore, AI is transforming clinical development through natural language processing and machine learning, which use real-world evidence and electronic health data to improve patient recruitment, trial design, and protocol adaptation.

This strategy accelerates the conversion of molecules into therapies, saving time, enhancing prediction accuracy, and lowering costs, allowing clinical trials to take place in less than a year.

Keywords: Artificial Intelligence, Adversarial Networks, preclinical studies, pharmaceutical, Machine Learning

Abstract Id: PCM-OP-03

Role of AI in Developing Personalized Drug Delivery Systems

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Abstract

Artificial intelligence (AI) is transforming personalized drug delivery by enabling precise, safe delivery of therapeutic agents to individual medical needs. By processing multilayer biomedical data—including genomics, proteomics, clinical biomarkers, imaging information, and physiological monitoring—AI-driven systems, such as machine learning and neural networks, can accurately predict drug response, optimize dosage, and support patient-specific formulations, advancing precision medicine. AI also plays a pivotal role in formulation design and improvement, demonstrating the ability of AI systems to model key formulation parameters such as solubility, stability, drug-excipient interactions, and systemic kinetics. AI algorithms can evaluate and predict critical parameters far more efficiently than traditional trial-and-error methods, significantly accelerating formulation development and reducing experimental uncertainty. AI-driven computational platforms enhance the design of nanocarriers, hydrogels, smart polymers, and implantable or wearable devices, paving the way for stimulus-responsive release. Such adaptive systems respond to real-time physiological cues, allowing personalized and precise drug release for complex conditions including cancer, diabetes, cardiovascular, and neurodegenerative disorders. Despite these advances, challenges remain in data quality, algorithm transparency, regulatory validation, and ethical governance. Enhancing secure data sharing, reducing algorithmic bias, and developing standardized validation pathways are essential. Interdisciplinary collaborations across computational sciences, pharmaceuticals, and clinical fields will accelerate clinical translation of AI-enabled personalized drug delivery systems.

Keywords: AI-based drug delivery, precision medicine, machine learning, nanocarriers, biomaterials, real-time sensing, controlled release, PK/PD modeling, adaptive drug systems, real-time monitoring.

Abstract Id: PCM-OP-04

Managing Algorithmic Drift and Bias in AI-Enabled Software as a Medical Device: A Scoping Review of Quality Risk and CAPA Approaches

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Abstract

Background: The adaptive nature of Artificial Intelligence-enabled Software as a Medical Device (AI-SaMD) introduces significant challenges in managing algorithmic drift and bias, posing critical risks to patient safety and health equity, particularly in low-resource settings.

Objective: This scoping review aimed to synthesize evidence on the application of Quality Risk Management (QRM) and Corrective and Preventive Action (CAPA) processes to mitigate these algorithmic risks throughout the AI-SaMD lifecycle.

Methods: Following PRISMA-ScR guidelines, a systematic search was conducted across four electronic databases (PubMed, Scopus, Web of Science, IEEE Xplore) and grey literature from major regulatory bodies (FDA, EMA, IMDRF, WHO) from 2016 to 2025.

Results: From 114 unique records, 10 sources were included. The analysis revealed a stark geographical imbalance, with evidence predominantly from high-income countries and a critical lack of operational strategies for low- and middle-income countries (LMICs). Findings indicated that most QRM approaches for drift (e.g., continuous monitoring, Predetermined Change Control Plans) and CAPA strategies for bias (e.g., fairness audits) remain conceptual. A significant implementation gap exists, with no frameworks successfully integrating QRM and CAPA into a practical, globally applicable quality system.

Conclusion: There is an urgent need for a harmonized, equity-focused safeguard framework that moves beyond theoretical proposals. This framework must integrate proactive risk management and corrective actions into the AI-SaMD lifecycle, ensuring safe and equitable adoption across diverse global health systems.

Keywords: AI-SaMD, Algorithmic Drift, Algorithmic Bias, Quality Risk Management, Corrective and Preventive Action (CAPA), Global Health Equity, Regulatory Science.

Abstract Id: PCM-OP-05

Artificial Intelligence and Machine Learning in Novel Drug Discovery

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Abstract

The integration of artificial intelligence (AI) and machine learning (ML) has revolutionized the landscape of modern drug discovery, transforming a traditionally lengthy and costly process into a faster, data-driven, and more precise endeavor. AI and ML algorithms enable the rapid analysis of vast chemical, biological, and clinical datasets to identify novel drug targets, optimize lead compounds, and predict pharmacokinetic and toxicological profiles with remarkable accuracy. These technologies assist in every stage of drug development—from target identification and hit discovery to preclinical testing and clinical trial optimization—thus reducing the time and expense associated with conventional methods.

Deep learning and neural network-based models are particularly effective in molecular property prediction, virtual screening, and de novo drug design. Techniques such as structure-based drug design, quantitative structure–activity relationship (QSAR) modeling, and natural language processing (NLP) applied to biomedical literature further enhance decision-making and innovation. Successful applications include AI-driven identification of novel antibiotics, repurposing of existing drugs for rare diseases, and the design of peptide-based therapeutics. Despite these advances, challenges persist, including data quality issues, lack of interpretability in complex models, algorithmic bias, and limited experimental validation.

In conclusion, the synergy between AI, ML, and pharmaceutical sciences is reshaping the paradigm of drug discovery, paving the way for precision medicine and faster therapeutic innovation. Continued efforts in algorithm refinement, data integration, and ethical governance will be crucial for realizing the full potential of intelligent drug design.

Keywords: Artificial intelligence, Machine learning, Drug discovery, Deep learning, QSAR, Virtual screening, Target identification, Precision medicine, Computational pharmacology.

Abstract Id: PCM-OP-06

Biologics and Biosimilars: Market Trends and Regulatory Challenges - A Global Perspective

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Abstract

The global market for biologics and biosimilars is experiencing robust growth driven by rising demand for targeted therapies, especially in fields like oncology, autoimmune diseases, and diabetes. Biologics, including monoclonal antibodies and recombinant proteins, are crucial in modern medicine but often come with high costs, making biosimilars—highly similar, lower-cost alternatives—key to expanding patient access globally. The biosimilars market is expected to nearly double from USD 561.7 billion in 2025 to over USD 1.15 trillion by 2035, with significant growth in regions like the U.S., Europe, and Asia-Pacific. This expansion is supported by patent expirations of major biologics, streamlined regulatory approvals by agencies such as the FDA and EMA, and increasing healthcare cost pressures.

Regulatory challenges remain a critical factor in biosimilar development and adoption. While major markets like the U.S. and EU have established pathways for biosimilar approval, emerging economies face issues such as inconsistent regulatory requirements, lack of standardized approval processes, and transparency concerns regarding interchangeability and substitution. These disparities can delay marketing authorizations and pose a hurdle to market growth. Harmonization of regulatory frameworks, improved clinical trial designs, and collaboration among global regulatory bodies are essential to overcome these barriers and fully realize the benefits of biosimilars worldwide. In summary, the biologics and biosimilars landscape is marked by strong market growth fueled by clinical and economic drivers and evolving regulatory frameworks. Addressing regulatory challenges through global cooperation and standardization will be crucial for expanding access and fostering innovation in this transformative sector of healthcare.

Keywords: Biosimilar growth, Global biosimilar trends, Patent expirations, Cost-effective biologics, Chronic disease therapies, Biopharmaceutical innovation, Healthcare accessibility

Abstract Id: PCM-OP-07

Toxicity and Regulatory aspects of Biomaterials

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Abstract

Background: Biomaterials are natural or synthetic materials designed to interact with biological systems for medical, environmental, or industrial applications. Despite their expanding market and crucial healthcare role, ensuring safety and establishing consistent regulatory frameworks remains challenging. Regulatory inconsistencies impede innovation, increase development costs, and potentially compromise patient safety.

Objectives: To systematically examine toxicity concerns and regulatory frameworks governing biomaterials across major regions (USA, EU, India, China & Australia) and evaluate international standards from OECD and ISO organizations. We aimed to identify regulatory gaps, assess challenges posed by advanced materials, and propose solutions for harmonized global regulation.

Methods: A comprehensive systematic review was conducted following PRISMA guidelines. Multiple electronic databases were searched to identify relevant studies examining biomaterial toxicity assessment methods and regulatory frameworks. Studies were screened based on predetermined eligibility criteria focusing on regulatory standards, toxicity evaluation methods, and safety protocols. Data extraction encompassed regulatory requirements, testing methodologies, and approval pathways.

Results: Analysis revealed significant regulatory heterogeneity across jurisdictions, with traditional testing methods inadequately addressing risks from advanced materials including nanomaterials and 3D-printed tissues. Major gaps included absence of unified global approaches, insufficient evaluation methods for complex dynamic biomaterials undergoing transformation in vivo, and lack of systematic long-term monitoring systems.

Conclusions: Substantial improvements are achievable through innovative approaches including computational modelling for expedited approvals, smart implants incorporating embedded sensors for real-time monitoring, and establishment of international databases to eliminate redundant testing. These recommendations could enhance

regulatory efficiency, improve patient safety, and facilitate global harmonization while accelerating access to life-saving technologies.

Keywords: Biomaterial toxicity, Biocompatibility, ISO 10993, Good Manufacturing Practices (GMP), Material property validation, Chemical stability, Mechanical strength.

Abstract Id: PCM-OP-08

Ethical and Managerial Challenges in Pharmaceutical Marketing: Balancing Profitability, Compliance, and Patient Welfare

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Abstract

The Indian pharmaceutical industry functions between the boundaries set by healthcare objectives, ethicality, and business sense, where there is compulsion to achieve sales and acquire a certain market share but there certainly is a more pronounced obligation to uphold the welfare of patients. The Indian pharmaceutical industry is one of the world's largest generic drug producers, and so the ethical challenges in drug promotion are not only huge in number, but also complex. This study explores the managerial and ethical dimensions of pharmaceutical marketing, with a focus on compliance of the pharma industry with the government established Uniform Code for Pharmaceutical Marketing Practices (UCPMP). It uses a qualitative and descriptive research design. The paper analyses the primary data collected from a survey of medical practitioners, hospital administration, pharmacy store owners and general consumers in public. Secondary data is taken from academic literature, policy documents, and case studies to categorise key ethical dilemmas and the managerial strategies used. The findings suggest that the pressure posed by profit anxiety and competitive market position, leads to compromised ethical integrity in drug promotion. The study infers that there is need for stronger ethical comportment as well as stronger regulatory enforcement to ensure that marketing strategies are in tune with patient-centred objectives. The study also submits the view that ethical marketing is not merely a compliance requirement but a strategic necessity for sustainable growth for business units in India's pharmaceutical industry.

Keywords: Pharmaceutical marketing, ethics, management, drug promotion, UCPMP, India, compliance, pharmacology.

Abstract Id: PCM-OP-09

Optimizing Pharmacy Operations: Strategic Management Approaches for Enhancing Efficiency and Patient Care

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Abstract

This paper provides a strategic review of approaches to optimize pharmacy operations, focusing on the dual objectives of enhancing operational efficiency and improving the quality of patient care. In an increasingly complex healthcare environment, pharmacies face pressures to streamline processes while expanding their clinical roles beyond traditional dispensing. A key finding from a systematic review is the significant impact of methodologies like Lean and Six Sigma, which have been shown to reduce medication turnaround times, enhance inventory management, and minimize workflow bottlenecks. The integration of technology emerges as a central theme, with the implementation of pharmacy management systems and automation tools directly contributing to reduced administrative burdens, lower rates of dispensing errors, and more time for pharmacists to engage in patient-centered activities such as medication therapy management and counseling. While the use of predictive analytics and data-driven decision-making can also improve

financial outcomes and resource allocation, it is essential to align these strategies with the core mission of patient safety and clinical excellence. The research suggests that a holistic management approach, which combines technological investment with a focus on staff training and collaborative communication across the healthcare system, is crucial for achieving sustainable improvements in both business performance and patient outcomes.

Keywords: *Optimization,* pharmacists, clinical, healthcare, Six Sigma

Abstract Id: PCM-OP-10

The Impact of Artificial Intelligence on Resilience and Efficiency in Pharmaceutical Supply Chains: A Study on Predictive Analytics for Demand Forecasting and Inventory Management

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Abstract

The pharmaceutical industry continues to face unprecedented volatility driven by sudden demand surges, regulatory changes, complex serialization requirements, and global supply disruptions. This study investigates the transformative role of artificial intelligence (AI), particularly machine learning and deep learning techniques, in enhancing resilience and operational efficiency across pharmaceutical supply chains with a primary focus on predictive analytics for demand forecasting and multi-echelon inventory optimization.

Using a mixed-method approach combining real-world datasets from Indian and global pharmaceutical manufacturers (covering the period 2019–2025), time-series analysis, and simulation modeling, the research evaluates the performance of state-of-the-art algorithms including LSTM networks, Prophet, XGBoost, and hybrid deep reinforcement learning models against conventional statistical methods (ARIMA, exponential smoothing) and existing ERP-based planning systems.

Findings demonstrate that AI-driven models reduce demand forecast error (MAPE) by 38–57% and safety-stock requirements by an average of 29% while simultaneously improving service levels from 92% to 99.4% during disruption scenarios. The study further establishes that integration of external unstructured data sources (news sentiment, regulatory alerts, epidemic early-warning signals, and social media trends) into predictive models increases supply-chain resilience by enabling proactive risk mitigation up to 12–18 days earlier than traditional approaches.

A novel resilience-efficiency trade-off framework is proposed that quantifies the economic value of AI investments under varying disruption frequencies. The research concludes with actionable implementation road-maps and policy recommendations for pharmaceutical firms and regulators in emerging markets to achieve adaptive, data-driven supply chains capable of withstanding future pandemics and geopolitical shocks.

Keywords: Artificial Intelligence, Pharmaceutical Supply Chain, Demand Forecasting, Inventory Optimization, Predictive Analytics, Machine Learning, Disruption Management

Abstract Id: PCM-OP-11

IMDRF & GHTF – Their Role in Global Medical Device Harmonization

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Abstract:

Global harmonization of medical device regulations is essential to ensure patient safety, streamline approval processes, and promote international trade in healthcare technologies. The Global Harmonization Task Force (GHTF), established in 1992, was the first major international initiative to bring together regulators and industry representatives from the United States, Europe, Japan, Canada, and Australia to develop common principles for medical device

regulation. GHTF laid the foundational framework for risk-based classification, quality systems, adverse event reporting, and conformity assessment procedures that many countries still adopt today. Following its dissolution in 2012, the International Medical Device Regulators Forum (IMDRF) was established to continue and expand global harmonization efforts through a platform exclusively for regulators. IMDRF builds upon GHTF's legacy by developing authoritative guidance on essential topics, including Software as a Medical Device (SaMD), Unique Device Identification (UDI), clinical evaluation standards, personalized medical devices, and AI-based technologies. Together, GHTF and IMDRF have significantly shaped the global regulatory landscape by promoting convergence, reducing duplication of regulatory requirements, enhancing patient safety, and enabling faster global access to innovative medical technologies. Their ongoing work supports regulatory maturity in low- and middle-income countries, strengthening international collaboration toward a unified global medical device regulatory framework.

Keywords: IMDRF, GHTF, Medical Device Harmonization, Regulatory Convergence, Global Medical Device Regulation.